

CHAPTER 8

VERIFICATION OF THE COMPRESSIVE STRENGTH MODELS

This chapter verifies the compressive strength models of normal concrete and special concrete. It is obvious that the proposed models for compressive strength give satisfactory results.

8.1 Verification of the Compressive Strength Model for Conventional Concrete Cured at any Isothermal Temperature

The models were verified by the test results obtained from many researchers. The verification was presented in the form of comparison between experimental data (dot) from various sources and model (line and dash-line) as shown in Fig. 8.1-8.19. (Details of the verification are given in Appendix C).

8.1.1 Verification of compressive strength at any considered age t and cured at room temperature

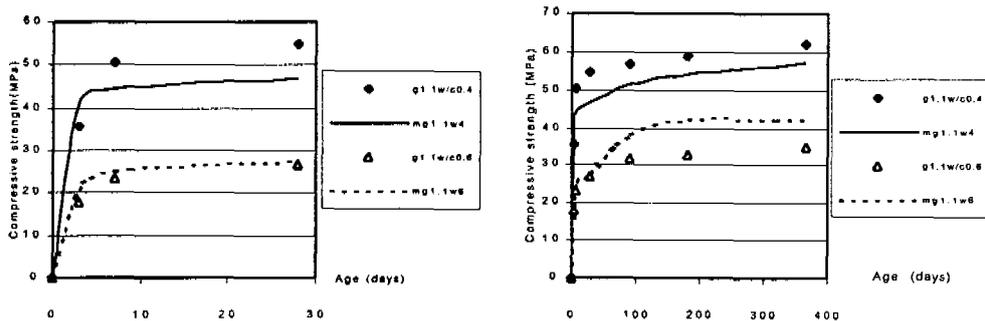


Fig. 8.1 Verification of compressive strength of concrete

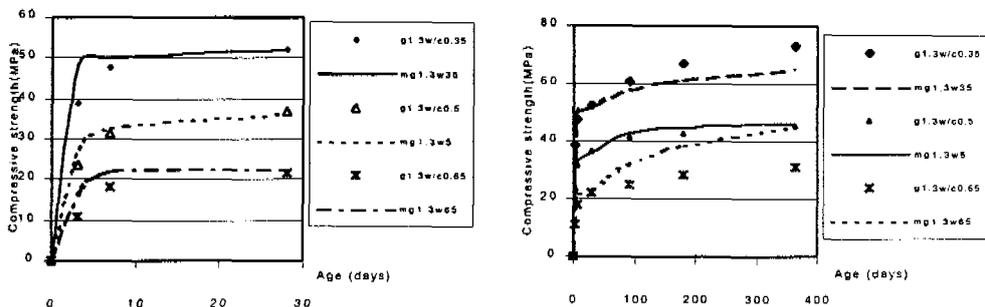


Fig. 8.2 Verification of compressive strength of concrete

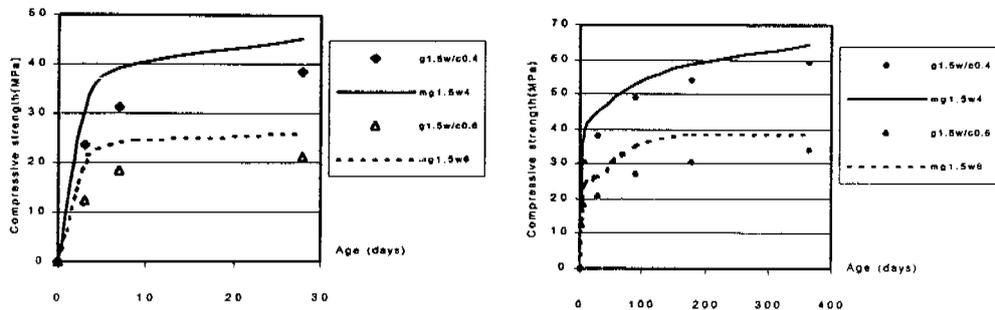


Fig. 8.3 Verification of compressive strength of concrete

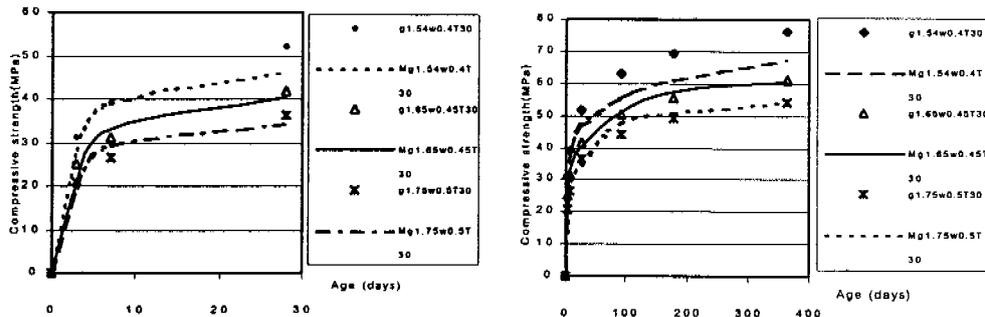


Fig. 8.4 Verification of compressive strength of concrete

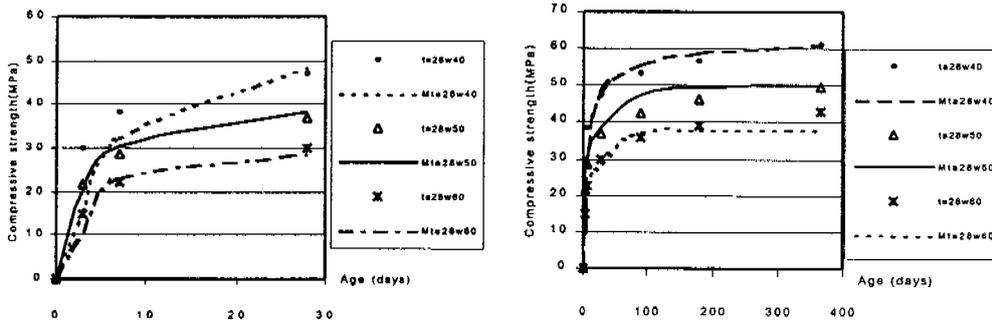


Fig. 8.5 Verification of compressive strength of concrete

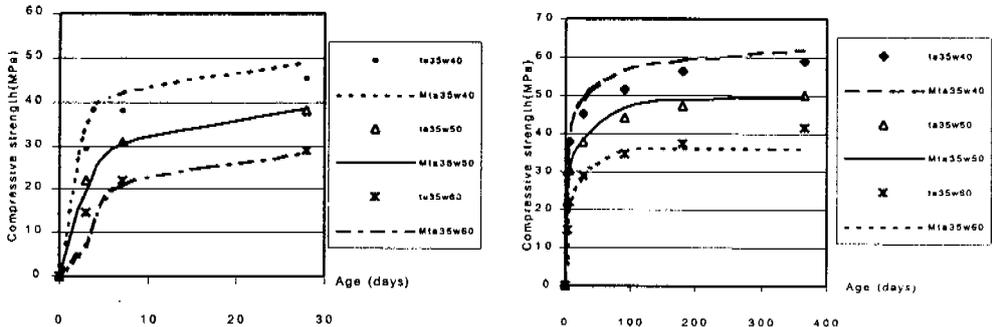


Fig. 8.6 Verification of compressive strength of concrete

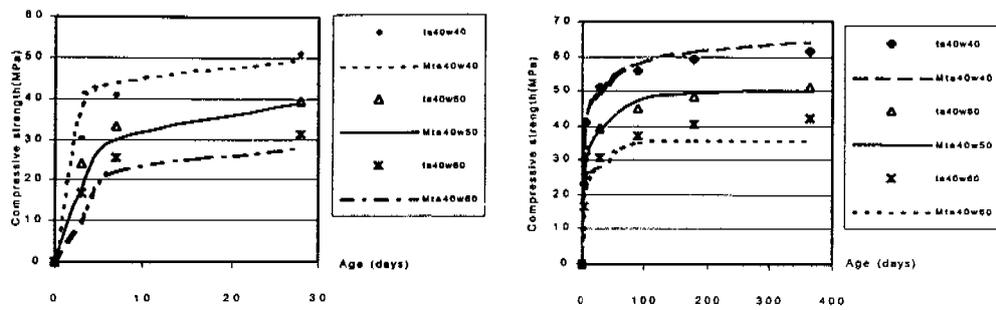


Fig. 8.7 Verification of compressive strength of concrete

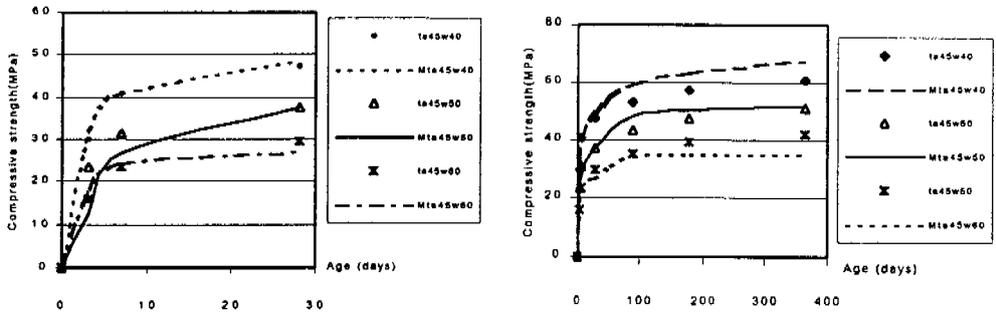


Fig. 8.8 Verification of compressive strength of concrete

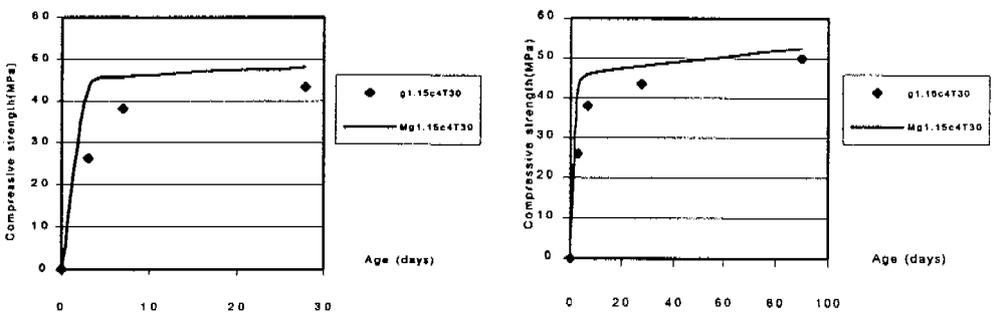


Fig. 8.9 Verification of compressive strength of concrete

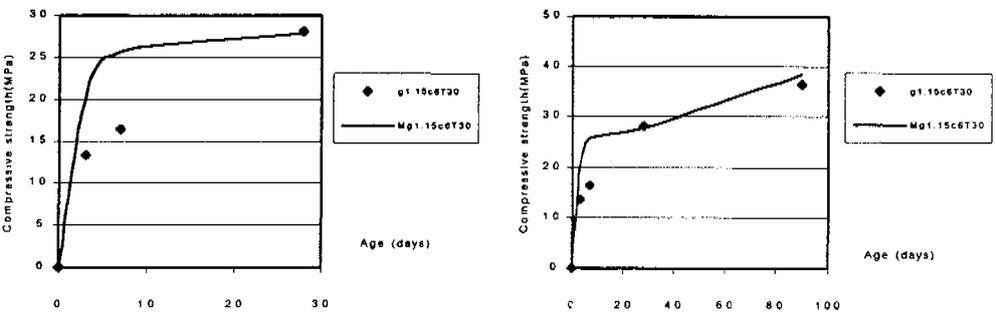


Fig. 8.10 Verification of compressive strength of concrete

8.1.2 Verification of compressive strength at any considered age t and elevated curing temperature

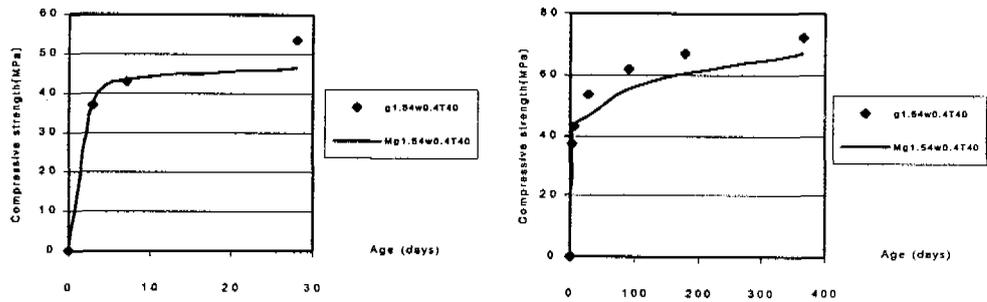


Fig. 8.11 Verification of compressive strength of concrete cured at 40°C

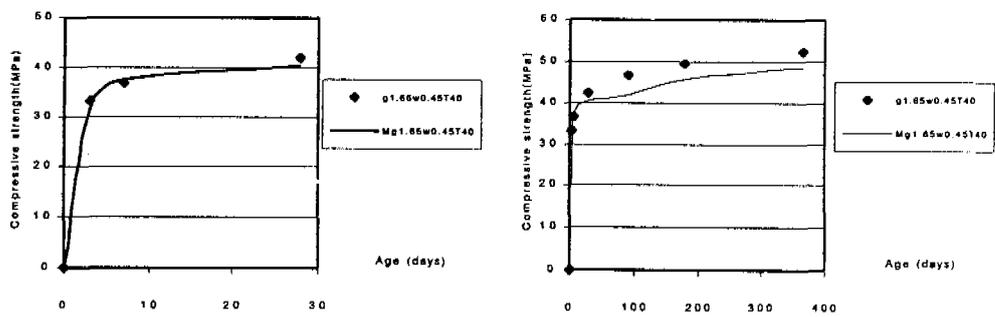


Fig. 8.12 Verification of compressive strength of concrete cured at 40°C

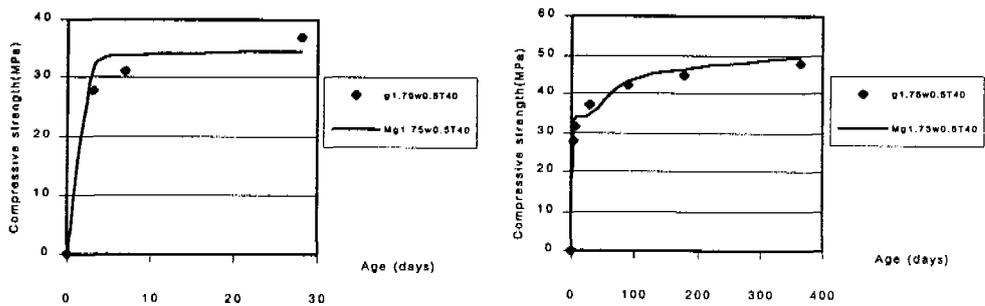


Fig. 8.13 Verification of compressive strength of concrete cured at 40°C

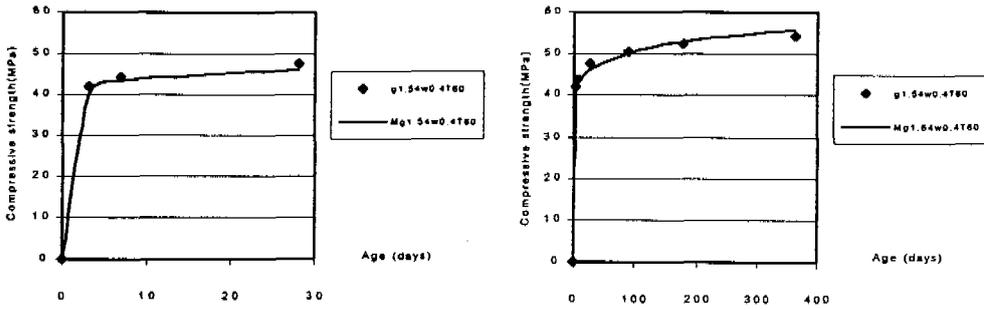


Fig. 8.14 Verification of compressive strength of concrete cured at 60°C

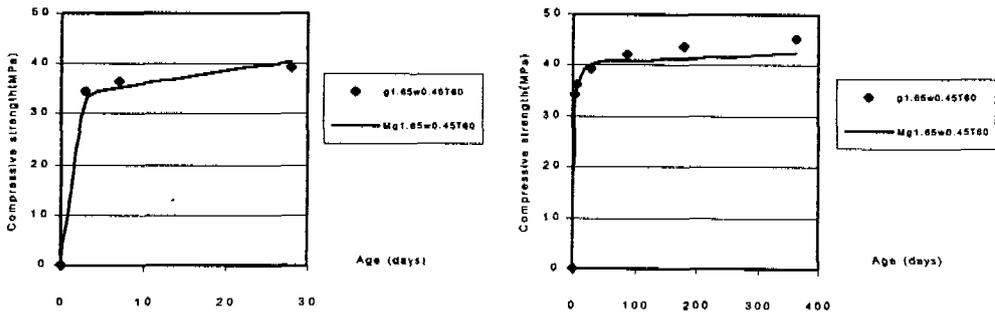


Fig. 8.15 Verification of compressive strength of concrete cured at 60°C

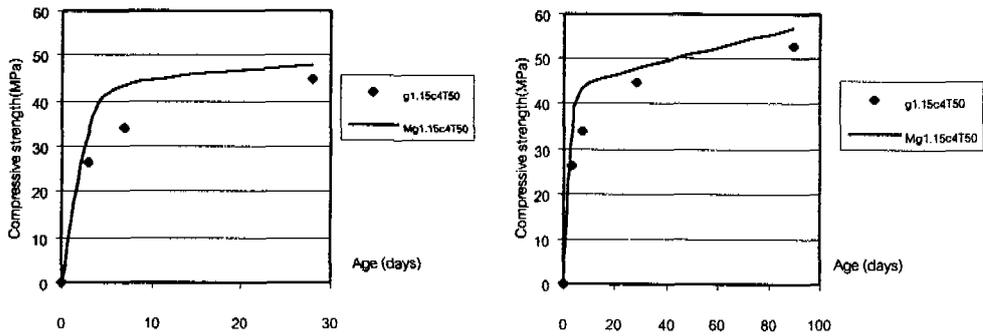


Fig. 8.16 Verification of compressive strength of concrete cured at 50°C

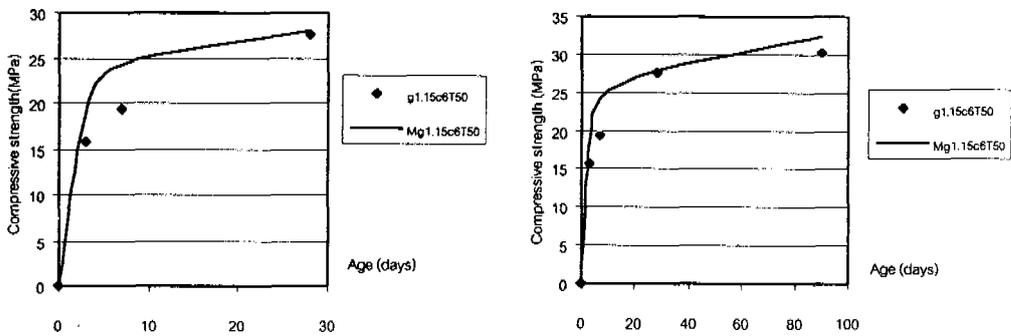


Fig. 8.17 Verification of compressive strength of concrete cured at 50°C

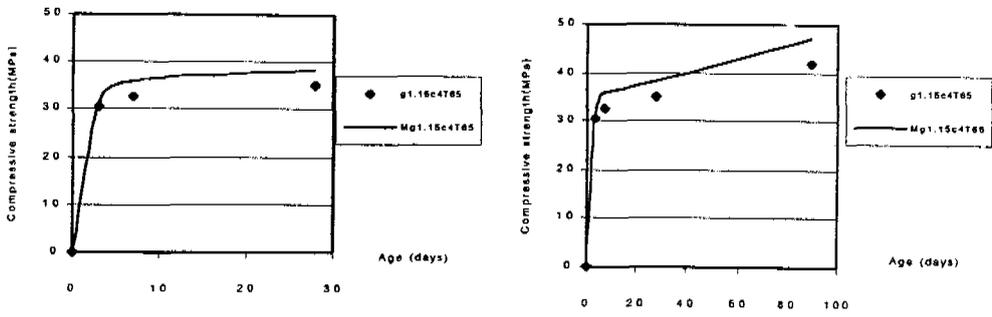


Fig. 8.18 Verification of compressive strength of concrete cured at 65°C

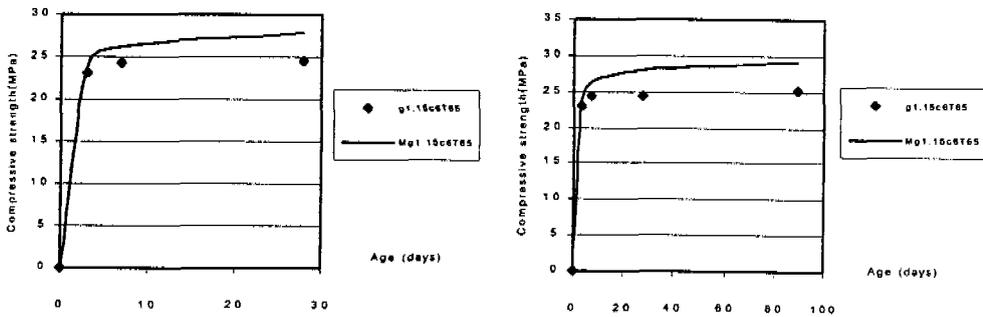


Fig. 8.19 Verification of compressive strength of concrete cured at 65°C

8.2 Verification of the Compressive Strength Model for Special Concrete

The models, which are show from Eq. (7.1) to Eq. (7.3), were verified for roller-compacted concrete. While the model from Eq. (7.4) is verified for self-compacting concrete. (Details of the verification are shown in Appendix C).

8.2.1 Verification for roller-compacted concrete model

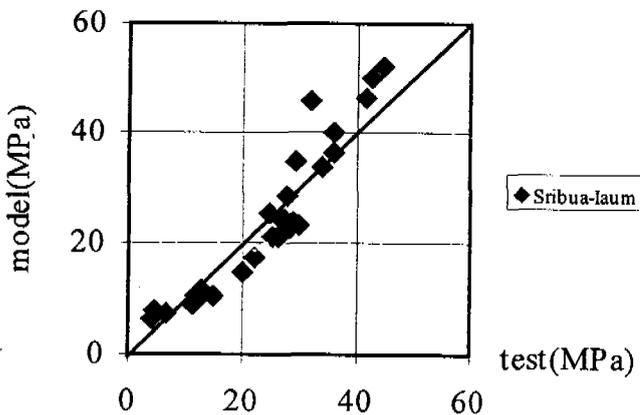


Fig. 8.20 Relationship between tested data and the predicted value of 3-day compressive strength

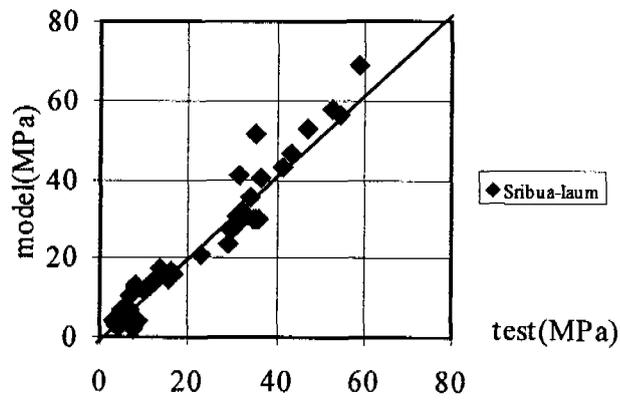


Fig. 8.21 Relationship between tested data and the predicted value of 7-day compressive strength

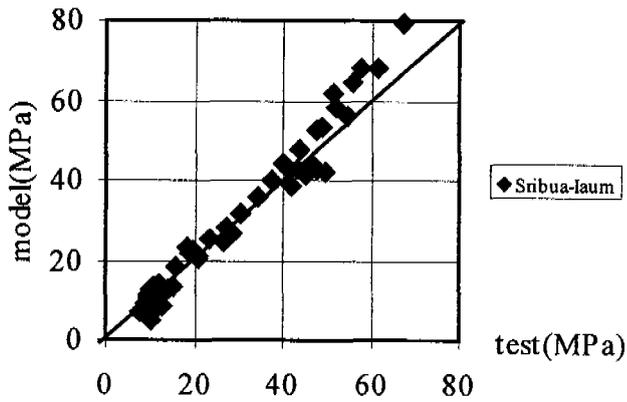


Fig. 8.22 Relationship between tested data and the predicted value of 28-day compressive strength

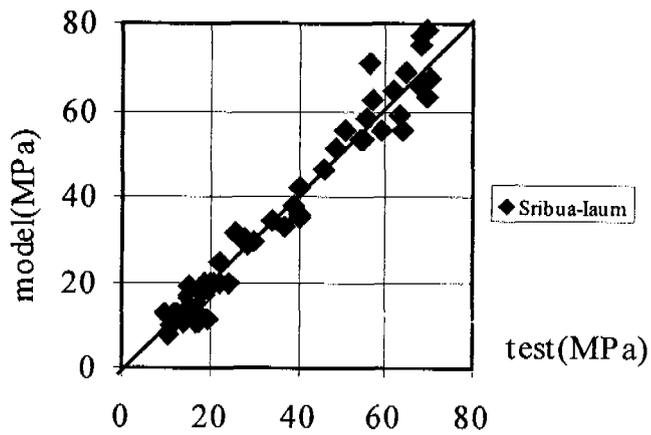


Fig. 8.23 Relationship between tested data and the predicted value of 91-day compressive strength

8.2.2 Verification for 28-day compressive strength of self-compacting concrete model

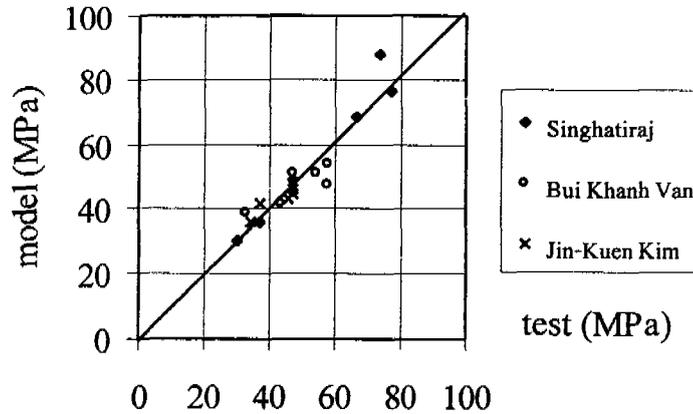


Fig. 8.24 Relationship between tested data and the predicted value of 28-day compressive strength

8.2.3 Verification for compressive strength of high air content concrete

Besides from RCC and SCC, the model was applied to predict the compressive strength of concrete that contain high air content in mix proportion as shown in Fig. 8.25.

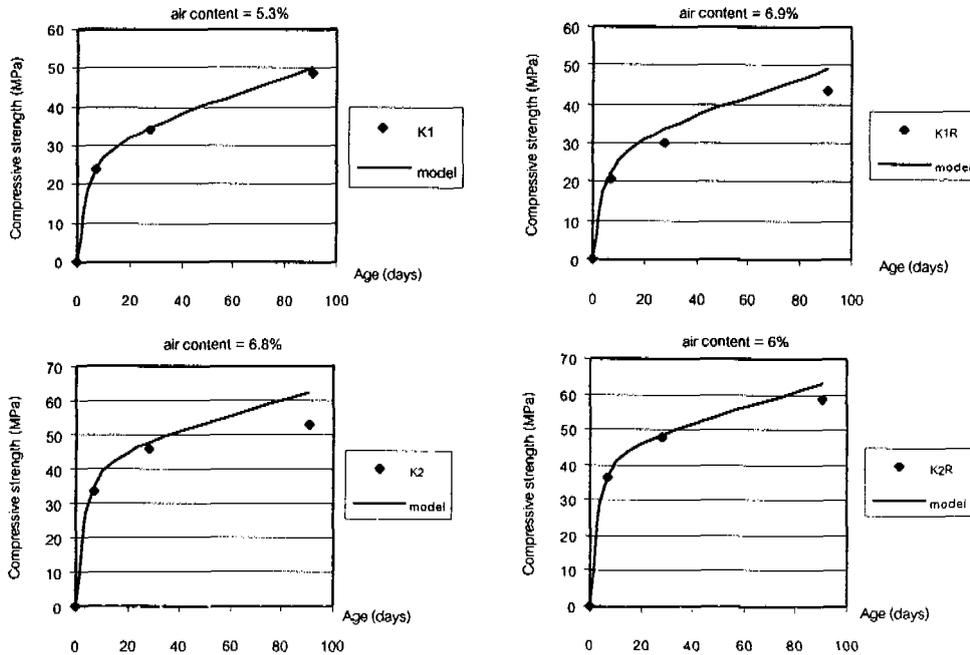


Fig. 8.25 Verification of compressive strength of high air content concrete

It can be seen that the model is overestimate. Because the higher air content causes higher void and lower density, which result in lower strength in concrete. Fortunately, Thailand is located in hot climate area. It is unnecessary to provide space for freezing and thawing in concrete.