

Sitthichai Chintrakarn 2011: Early-age Compressive Strength of Concrete and Fly Ash Concrete with Application of Microwave Curing Technique. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Prasert Suwanvitaya, Ph.D. 110 pages.

Microwave curing processes involving power level at 70 Watt and heating period of 3, 5 and 7 hours were used to obtain early compressive strength of concrete and fly ash concrete at 1 day. These processes were also used for compressive strength estimation of the 28-day strength of normally cured specimens. Test parameters included the amount of fly ash replacement, at 0%, 30% and 50% by weight of cement, slumps and water/binder ratios. Mix proportions were designed according to the ACI mix design using Type I cement, Mae-Moh fly ash, natural construction sand and crushed limestone.

The maximum strength of microwave cured specimens reached 74% of 28-day normally cured. The compressive strength of various mix proportions of 1-day microwave cured specimens and 28-day normally cured specimens could be used to estimate the 28-day compressive strength estimation. The estimation yielded the maximum percentage of error at 6.4%.

The 1 day of microwave cured sample (by 7 hours of application time) and normally cured of cement pastes containing fly ash 0%, 30% and 50% with W/B=0.411 were tested by microstructure analysis. From MIP result, it was shown that microwave curing technique could decrease the pore radius and total porosity. XRD analysis showed that microwave curing application accelerated cement hydration.

---

Student's signature

---

Thesis Advisor's signature

\_\_\_\_/\_\_\_\_/\_\_\_\_