Pirakiat Sumran 2010: Estimation of Compressive Strength of Concrete in Existing Structure by Rebound Hammer and Ultrasonic Pulse Velocity Methods. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Assistant Professor Sompothi Vivithkeyoonvong, Ph.D. 94 pages.

The objective of this research is to present equations for estimation of compressive strength of concrete structures which are restrained and stressed internally by the use of rebound hammer and ultrasonic pulse velocity methods. They were modified from the equation , which estimates compressive strength of concrete , resulted from the tests of 1920 – 15 x 15 x 15 cm. concrete cubes namely , LN(CST) = $0.3110*k_1*UPVT + 0.03209*k_{21}*k_{22}*RHT + 3.322$

This research had performed Rebound Hammer and Ultrasonic Pulse Velocity tests for 18 spots in existing reinforced concrete structures. There were 6 spots in columns , 6 spots in beams and 6 spots in slabs. After the tests , the concrete samples were drilled out to find compressive strengths by standard compression test. The equations for estimation of compressive strength of concrete structures were obtained by substitute the compressive strength of concrete samples (CST) and the calibrated rebound numbers(RHT) into the above equation.

The equations for estimation of compressive strength of concrete in existing structures which are restrained and stressed internally by the Rebound Hammer and Ultrasonic Pulse Velocity methods are : $LN(CST) = 0.3110*k_1*UPVT + 0.03209*k_{21}*k_{22}*RHT + 2.987$ for reinforced concrete column , $LN(CST) = 0.3110*k_1*UPVT + 0.03209*k_{21}*k_{22}*RHT + 3.055$ for reinforced concrete beam and $LN(CST) = 0.3110*k_1*UPVT + 0.03209*k_{21}*k_{22}*RHT + 3.124$ for reinforced concrete slab. Where CST is compressive strength of concrete structure. UPVT is ultrasonic pulse velocity and RHT is rebound number from calibrated Schmidt Hammer.

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