The Schmidt hammer is commonly used for the prediction of unconfined compressive strength and other mechanical properties of rocks from surface rebound hardness values since it is quick, easy, inexpensive, and non-destructive testing method. In this study, metamorphic, sedimentary, and igneous rock samples were collected from various locations in Turkey to predict the rock strength from Schmidt rebound hardness. Schmidt rebound tests were performed on cubic samples with an edge length of 11 cm and uniaxial compressive strength tests were carried out on cubic samples with an edge length of 5 cm in accordance with ASTM and EN standards and suggested procedure by ISRM. New relationship coefficients between unconfined compressive strength and Schmidt rebound hardness values were suggested according to rock type. Finally, some diagrams were developed to be practically used for estimating the uniaxial compressive strength from Schmidt rebound hardness values by considering the sample size obtained from the experimental work.