This paper presents the possibilities of applying ultrasonic methods in asphalt concrete specimen testing in order to estimate fatigue life using ultrasonic characteristics of specimens. The procedures and results of testing cylinder shaped samples of both ultrasonic analysis and fatigue life testing are described. The ultrasonic method was first used in order to obtain the seismic characteristics of specimens. Then, the specimens were tested for fatigue lives using the repeated-loading indirect tensile test equipment (SDU-Asphalt Tester). To be able to model the fatigue lives, in addition to conventional fatigue model parameters new parameters from this ultrasonic analysis were taken into consideration. These additional parameters are acquired from the seismic measurements. Hence, only by examining the ultrasonic method, it will be possible to predict the fatigue lives of the specimens non-destructively.