In this study, lateral and vertical compactness were investigated in the cohesive and noncohesive soil fill materials in an embankment dam. Field compaction process of fill materials were performed by a sheepsfoot roller and a vibration roller. In general, “the test methods for rapid determination of percent compaction”, “the water replacement method” are used for quality control of compacted soil. In addition to these methods, multichannel analysis of surface waves and refraction methods were applied for compaction quality-control tests in the Serik Akbaş Dam (in Manavgat-Antalya) located in the north of Turkey. The results obtained from each method were compared. Seismic methods have linear and areal value whereas classical methods have point density value. Therefore, variations of lateral and vertical units were defined using seismic methods. Furthermore, Young's modulus (E), shear modulus (G), bulk modulus (K), and Poisson's ratio (μ) of compacted soil were calculated. The results show that it is seen that seismic velocities are increased when soil compress at a percentage of a standard maximum density and optimum moisture content.