It is very important to know the dynamic parameters of the ground and to design the structure in direction of these parameters before construction starts in geography with high earthquake risk. Geophysical engineering plays an important role in determining the physical, elastic, durability and dynamic properties of the ground. However, when the buildings damaged during earthquakes are examined, it is understood that the only problem is not the ground but also the structure of the building. In this direction, two parameters are important. The first is the strength of concrete. The second is the dominant vibration period values. In determining the risky structure, it is important to determine the predominant vibration periods of the ground and structure as well as the concrete strength. In this study, the strengths of concretes in total 128 buildings in 10 districts of Izmir were determined by using non-destructive ultrasonic and Schmidt hammer methods in-situ, and uniaxial pressure test destructively applied in laboratory to the cores taken from the same places where non-destructive measurements were made. Concrete compressive strength values obtained from destructive and non-destructive methods were compared. In addition, predominant vibration periods of the ground and structure in order to investigate the resonance state of the building were obtained from microtremor measurements applied on both ground and building floors. In the design of the building, dominated vibration period of the ground has an important place in terms of building resonance. In order to avoid the resonance of the structure, it should be ensured that the dominant vibration period is not within the range of $T_a$ and $T_b$ values obtained from the ground. In this study, period and resonance conditions of the buildings were investigated by taking microtremor measurements in 10 buildings in Izmir region and the natural grounds of these buildings. Accordingly, the period of the structures studied ranged from 0.24–1.47s while resonance status was detected in 2 structures. As a result of all these studies, the place, importance and solution suggestions of geophysical methods in structural risk investigations are examined and empirical relationships with ±2MPa error for concrete strength in situ are presented. The use of P wave velocity in situ to determine building concrete strength will provide both time and spatial information. If ultrasonic P wave measurements are made in all columns and the location of the core is determined, the structure will be less damaged.