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# Design and Performance of Earth Retaining Structures

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FIFTY YEARS OF LATERAL EARTH SUPPORT

by  
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Like most students of my generation, I was introduced to the subject of lateral earth support by learning the derivation of Coulomb's formula in about my junior year. The derivation was straightforward enough; without explanation or apology, the surface of sliding was taken as a plane, the properties of the soil were characterized by the angle of repose, and the point of application was said to be at one-third the height of the retaining structure. The objective of the exercise was apparently to determine the loading that, once obtained, would permit the more serious business of learning how to carry out the structural design of a retaining wall.

Two years later, in a course in harbor engineering during my first year of graduate work, my professor called attention to the series of articles in Engineering News-Record in which Terzaghi described the results of the MIT experiments showing the relationships among the magnitude of the earth pressure, its point of application, and the manner and extent of movement of the retaining structure. These articles seemed to introduce complications into what had heretofore been the simple concepts of active and passive earth pressure. I must confess that neither my professor nor his students attached much significance to the articles.

However, three years later, I found myself at Harvard where Arthur Casagrande enlightened us on the importance of the findings and made it clear that for any real retaining wall with a factor of safety greater than unity the earth pressure must be greater than the active

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