

## Generalized Zero Extension Line Theory

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The concept of zero extension line (ZEL) of earth pressure for granular media was first introduced by the authors in 1979. Since then, numerous extensions and applications of the theory to active, passive, and seismic earth pressure problems have been developed.

In this paper, the original theory has been generalized by the introduction of the concept that any field of straight lines drawn through a granular media can be considered a zero extension line net. This concept not only makes earth pressure computations much simpler to accomplish, but also opens up broader applications of the limit state theory of earth pressure.

A zero line is defined as a line along which the linear incremental strain is zero. To construct a zero extension line field, first a stress field is constructed based on an initial value of angle of internal friction. Then, by assuming the direction of major compressive stress coinciding with the direction of major incremental compressive strain, and by assuming a relationship between the angle of internal friction and the angle of dilation, the zero extension line field is developed. The generalized extension line theory will be used to compute the coefficients of lateral earth pressure for active and passive cases in loose and dense sands behind a vertical retaining wall for various values of wall roughness. The computed values will be compared with those predicted by other theories.

(full paper was not provided by the authors)

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