

French practice for design of embedded walls: history and background, overview of limitations of different models and calculation approaches

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French practice for the design of embedded walls intensively relies on active and passive limit equilibrium analyses, in the tradition of the work by Coulomb, Caquot, Kérisel and Absi, as well as on the more recent method involving spring coefficients, the use of which has become almost systematic, in the continuity of the approaches initiated by Terzaghi and Ménard. This latter method has ever since been improved and refined by intensive geotechnical monitoring, and is of course substantiated, as needed, by the finite element method.

The parameters needed to check the serviceability limit states are most often derived from pressuremeter tests, interpreted in accordance with the principles initially established by Ménard, but here again refined by the feedback of monitoring.

The ultimate limit states are traditionally checked using global safety factors (approach 2 or now RFA as defined in EC7), the partial factors on the soil resistance parameters (approach 3 or now MFA) being used only for certain situations or types of structures.

This tradition, built up on pragmatism, excludes the unconditional use of a systematic approach and a single method, is based on the belief, every day strengthened by observation and measurement of the behavior of structures, that there is no unique model that would apply to all situations, and that, on the contrary, identification of the limits of existing models is essential.

In this lecture, we propose to present the different aspects of this national practice by explaining not only the backgrounds, but also the limits, as well as the way they are taken into account, or at least they should be when this is not the case.