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Discussion on Settlement of Embankments on Soft Clays (Roy E. Olson, 1998) ASCE Journal of Geotechnical Engineering, Vol. 124, No. 4, pp. 278 - 288

by Bengt H. Fellenius, M.ASCE, P. Eng.

The Author proposes to give the units of Coefficient of Consolidation its own symbol, T, and name it terzaghi (notice, in the SI-system, full names of units are given in lower case letters, e. g., newton and pascal). Indeed, this would be a fitting tribute to Dr. Terzaghi. However, the Author's proposal that the unit of the terzaghi be m^2/day violates the principles of how a derived SI-unit is composed. A combined SI-unit must be derived from base SI-units, and the base unit for time is seconds (s), not days (24-hour days), therefore, the base units of the terzaghi should be m^2/s.

We may or may not approve of the shift to the SI-system of units. However, the clock cannot be turned back and we must take care not to fall into the same haphazard use of units as prevalent in the old system of units. Therefore, the units for Coefficient of Consolidation, the "terzaghi" with the symbol T, must be m^2/s. The Author's typical range of values, 0.000,1 m^2/day through 0.1 m^2/day, will become approximately 1 µT through 1 mT, respectively, which are fair numerical values that only differ by 15 % from the Author's stated typical range.

All considered, the SI-system is superior to both the Imperial System of units (also called US customary units) and the old metric systems called cgs and MKSA, which the Discusser grew up with. This notwithstanding that a few SI units are too precise ,or have far too many zeros or decimals, making them awkward in everyday use. For example, for most everyday human endeavors, an inch is about as small a unit we can appreciate or the accuracy of a settlement prediction (at best), while the SI equivalent of 25 mm sounds too precise. Similarly, when considering precise numbers in the Imperial and SI systems of units, a 2 tsf stress from a footing is a suitable reference number, as is 1 ksi for the stress on a small area of a structural unit, e. g., concrete. We do not have quite the same appreciation of 200 KPa, or 7 MPa, respectively. For such simple numbers, however, applying the SI system becomes easy once we have used it for a while.

However, we cannot pick and choose between the units and principles of the system per our own preference. One advantage of the SI-system is precisely its rigidity and clarity, although it comes at a small price. Another is that when we get to use combined units in an analysis, SI-makes the life of an engineer so much easier.

There are those, usually people with a metric background, who pretend that they have gone SI, having abandoned the kg/cm^2 unit, for the use of the unit of “at” (atmospheric pressure equal to 98.1 KPa) or the use of the unit "bar" (equal to 100 KPa). Or the abominable unit N/mm^2, used by those who for some reason cannot bring themselves to accept the MPa. The N/mm^2 violates the rule that in the SI-system a prefix is only to be applied to the remunerator, the denominator is always to be kept at its base value.

Sure, the SI-system is not perfect. It was put together by human minds, which sometimes were too tied to old conventions. For example, in reference to the principle that all increasing multiples are to be expressed in upper case letters, e. g. M for mega, and diminishing multipliers lower case letter, e.g. m for milli (the Author mistakenly uses “mill.”), when the SI Committee came to the multiplier kilo, it regrettably suggested its symbol to be in lower case, writing km instead of Km for kilometre, for example. (It has been argued that the capital letter "K" should be reserved for temperature expressed in degrees kelvin, K. However, this is an overly puristic argument). Moreover, as the kilogramme is the base unit for mass, not the gramme, it is a pity that the committee did not rename the base unit , the kilogramme to, say, “ram” (somewhere, someplace there must have been a scientist by the name Ram that could be so honored). Then, a Kr would be a tonne. Well, we cannot win them all.

An advantage, often forgotten when discussing the pros and cons of the SI system, is that, in the SI system, formulas require input in the base units, which are N (newton) for load, Pa (pascal) for stress, m (metre) for length, etc. That is, a stress that, for example, typically is has a value of 5,000 KPa or 5 MPa must always be input as the numeral 5,000,000 or 5^x10^6, not as 5,000 or 5. Similarly, a unit weight value is always to be input in any formula as N/m^3, never mind that we usually indicate it using the units KN/m^3, that is, a unit weight of 19 KN/m^3 is to be input as 19,000. This eliminates the necessity of always indicate what units to use in a formula and many errors associated with guessing now common for many of the old formulae. For example, the Engineering News formula that requires input of hammer height of fall in feet and pile penetration in inches. (The reference to the Engineering News formula to illustrate a point should not be taken to mean that the formula would be of any real other pertinence to the profession).