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## *Discussion and Closure:*

# CLOSURE TO "ANALYTICAL SOLUTION FOR PASSIVE EARTH PRESSURE OF *c*-ϕ SOIL USING PRINCIPAL STRESS ROTATION ASSUMPTION"

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In this study (Ghaffari Irdmoosa and Shahir 2019) due to the lack of experimental studies concerning the translational mode of wall movement, the study of Dou *et al.* (2017) was used. It is notable that in Ghaffari Irdmoosa and Shahir (2019), the mode of wall movement in Dou *et al.* (2017) for rotation about top of the wall (RT mode) was mistakenly noted as translational wall movement (T mode).

As shown in Fig. 1 which is taken from Fang *et al.* (1994), rotation in a wall can be about a point above the top. Note that rotation about a point above the top when *n* equals zero (*n* is shown in Fig. 1), this becomes the RT mode. On the other hand, as *n* approaches infinity, this becomes the T mode. It is observed from Figs. 2 and 3 that the test data for $n = 0$ is the lower bound, while those for the T mode is the upper bound. Also, graphs for the T mode are similar to those for the RT mode with high values of *n*, and both are close to Terzaghi's equation.

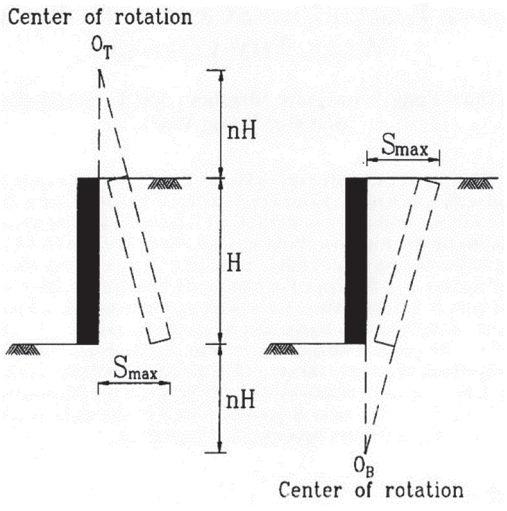
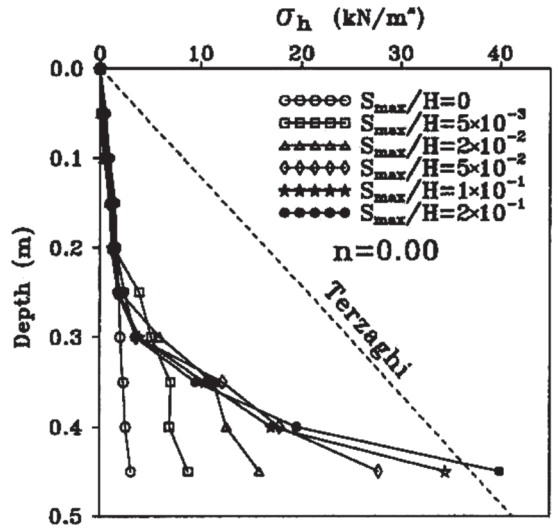
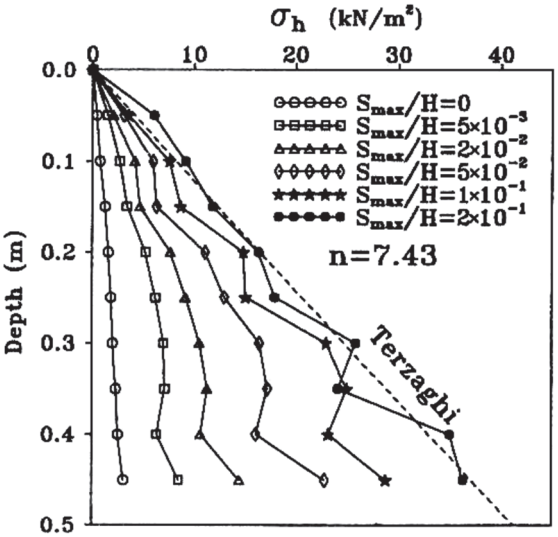



**Fig. 1 Modes of wall movement (Fang *et al.* 1994)**




(a) $n = 0$




(b) $n = 7.43$

**Fig. 2 Distribution of horizontal earth pressure for RT mode (Fang *et al.* 1994)**

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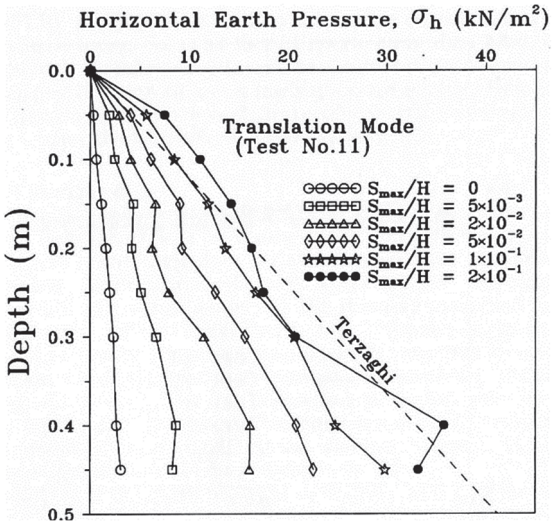



**Fig. 3 Distribution of horizontal earth pressure for T mode (Fang *et al.* 1994)**

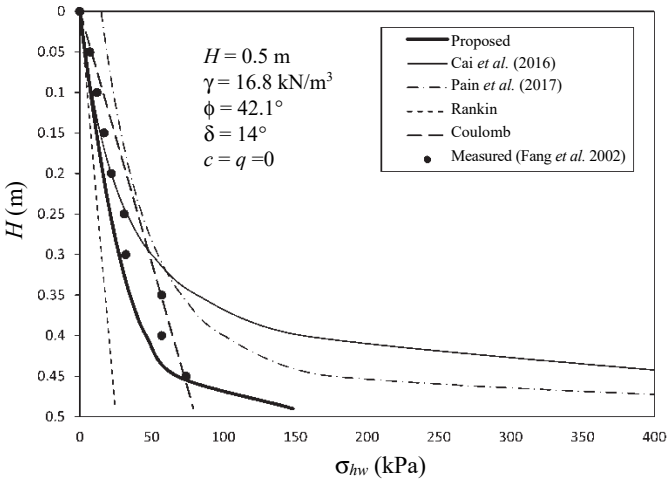
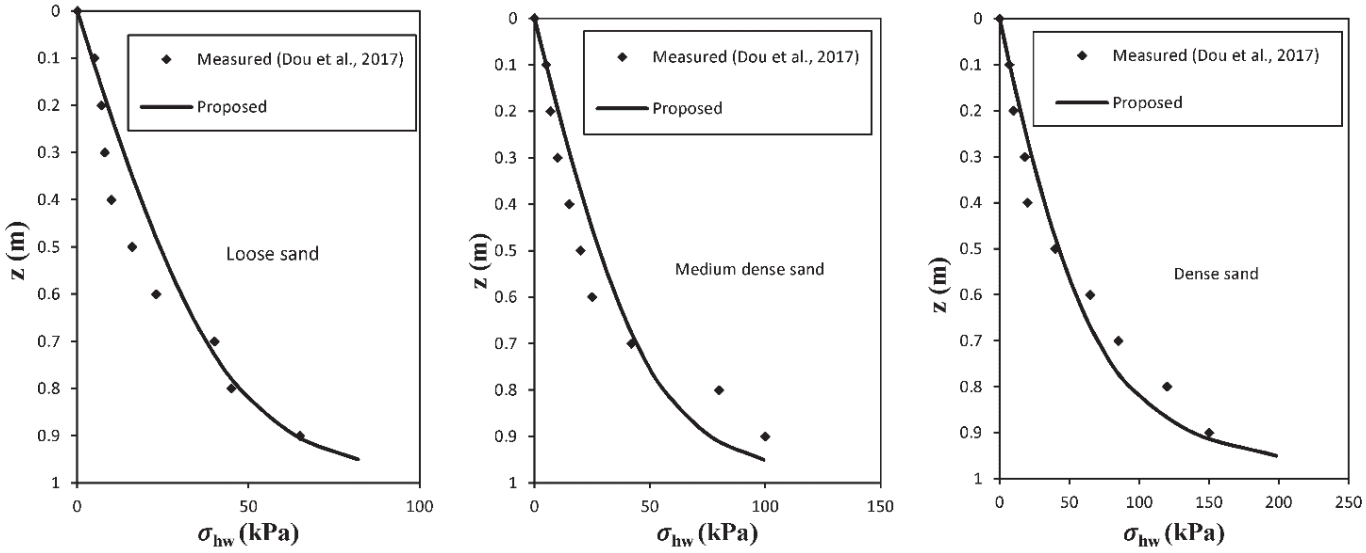



**Fig. 4 Comparison of passive earth pressure by analytical equations and test results (Ghaffari and Shahir 2019)**




(a) Loose sand (b) Medium dense sand (c) Dense sand

**Fig. 5 Comparison of passive earth pressure by proposed equation and test results of Dou *et al.* (2017): (a) loose sand; (b) medium dense sand; (c) dense sand (Ghaffari and Shahir 2019)**

As it can be observed from Fig. 4, the pressure values of the proposed model are lower than the measured values by Fang *et al.* (2002). On the other hand, in Fig. 5, the pressure values of the proposed model are slightly greater than the measured values by Dou *et al.* (2017) which is the lower bound. In other words, the values are in somewhat middle of these two values which are for two modes of wall movement. While there is no analytical study concerning a model for the RT mode, the model proposed by Ghaffari Irdmoosa and Shahir (2019) can also be used for the RT mode of wall movement.

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