ENGLISH SUMMARY

AN ANALYSIS OF PLYWOOD PLATES BY APPLICATION OF THE LARGE DEFLECTION THEORY

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In this article, the large deflection theory is applied in the analysis of simply supported plywood plates. The basic equations are given in a large number of references. The solution of the problem is effected by the application of the finite difference method. Plenty of attention is paid to the load distribution and to the possibility of the iterative solution. As an example, there is examined the stress distribution in a square plate loaded by a uniformly distributed load and by a concentrated load at the plate centre. Finally, there are given some results concerning the deflection and the ultimate load of dry square birch plywood plates loaded by a concentrated load.

ON THE DISTRIBUTION OF CONTACT PRESSURE UNDER A RIGID FOUNDATION ON SAND

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The stress distribution under a rigid foundation on sand is studied by using circular and square steel plates which were divided into ring-shaped or rectangular elements connected by steel rods (Fig. 2 and 3). This study covers both centric and eccentric loadings. The main purpose of the investigation is to explain the effect the loading intensity, the groundwater level, the foundation depth and lastly, reloading have on the distribution of the contact pressure. The effect of the loading intensity can be seen in Figs 4—11. Fig. 4 shows the effect produced by the groundwater level. The same becomes evident when comparing Fig. 7 with Fig. 8. Fig. 5 presents the effect of the foundation depth this becoming noticeable also from a comparison made between figures 9 and 10. The directions in which these factors take effect are also found statistically for 24 centric loading tests with the circular trial footing. Table 1 indicates that every factor of the statistical model is very significant. It can be seen that the loading intensity exerts an influence on the contact pressure distribution two times greater than that exerted by the groundwater level and the foundation depth when considering the investigation as a whole. This fact can be deduced from the coefficients a, b and c. The model used gives results of this particular investigation only and therefore cannot be used generally, especially as many factors were taken to be constants in the investigation at hand. The model, however, serves as an example illustrating the possibilities of statistical soil mechanics.

The test results are compared with Kany's method and with linear contact pressure. In the calculation of foundations one usually is on the »safe» side, when both of the abovementioned calculation methods are used. It is possible to evaluate the safety margin from Figs. 12—13, and to decrease the necessary factor of safety in accordance with this margin. It seems that a more accurate method must be found between both the before mentioned calculation methods (Fig. 14).

By increasing the load the point of the maximum contact pressure moves from the edges towards the point of action of resultant. The final contact pressure distribution at failure can be represented by topographic isobars resembling concentric circules, the centre of which coincides with the point of action of the resultant (Fig. 8). According to the ultimate bearing capacities found in loading tests the theory of Balla is the most suitable for calculating the bearing capacity of sand.