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*Iryna Khoruzhenko*

*R.O. Timchenko, PhD, prof., research supervisor*

*D.A. Krishko, PhD, senior teacher, research supervisor*

*S.V. Sokolova, language adviser*

*SIHE “Kryvyi Rih National University”*

## **ANALYSIS OF FOLDED-PLATE SHELL FOUNDATIONS APPLICATION**

Profitability increase of solutions in foundation engineering is to clarify the system of settlement schemes base-foundation construction, that is necessary for more complete usage of durable and deformational characteristics of base and foundation. That is why there is a need to design more flexible foundations in their projects on the natural base. At the present stage of foundation engineering there is a need to develop more advanced designs of foundations, which will be more economical, and can be used in the difficult engineering and geological conditions. Such foundations are folded-plate shell foundations diversified in form, area and conditions of use.

Active usage of such foundations is limited due to insufficient number of experimental and theoretical researches of joint work of folded-plate shells with base. However, there has been a significant increase in the number of new development of constructive solutions of such foundations and expansion of their effective usage – from the weak soil and peat to eternally frozen ground.

Foundations in the form of folded membranes are effective for weak, highly compressible soils and as floating bases. Nowadays there is experience of using folded-plate shell foundations all around the world - the USA, China, Mexico, France, etc. Shell foundation was developed at the Tyumen State Architectural Academy. It is a shell that lies at soil base and which is thin-walled and made of rein-

forced concrete of a zero or positive Gaussian curvature and with a system of cross beams, thus reinforcement of membrane is made with single-layer steel or synthetic reinforcement.

Particular interest is the usage of folded-plate shell foundations in water-saturated soils and in the marshes, especially during the setting of foundations for power lines towers. In some cases, these foundations are used on weak soils, which indicates an improvement of foundation work. If the soils at the base are characterized by high water absorption and compressibility, this leads to permanent settling of the earth's surface. In this case it is appropriate to use a floating foundation as a folded-plate shell. An example of such use was the construction of the USA embassy in Mexico City.

Folded-plate shell foundations for the towers of power lines were used in the construction of power lines of 220 kV in the Middle Urals and Tyumen region. The bases were built on marshes depth of 5-6 meters. Concrete folded foundations were constructed as separate thin folds that connected on top of by steel or concrete beam or girder. Electric poles with height of about 40 meters were installed on foundations. During the construction was received a major economic effect. The construction cost was reduced by 37% compared with the traditional arrangement of foundations.

Analysis of folded-plate shell foundations showed that these foundations are in many cases more effective solution not only in terms of conditions of interaction with the base, as well as economic reasons, as the material costs during the construction of such foundations are much lower than other foundations.

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