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STRESS-STRAIN STATE OF THIN-WALL SPATIAL COATINGS UNDER VARIOUS DESIGN SOLUTIONS OF CONTOUR STRUCTURES AND SHELL PLATES

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Abstract:
The scientific article presents the problems of studying the stress-strain state of contour structures and shells of thin-walled spatial coatings due to their joint work. Factors of changing the design solutions of contour diaphragms (bars) are given to study their joint work with shells. The issue of ultimate stresses and deformations of concrete in the biaxial stress-strain state of thin-walled spatial coatings in their corner zones is also considered. The factors of joint work of contour structures and shells for scientific research are established.

Keywords: stress-strain state, structures, shells, thin walls, spatial coatings, bar, diaphragm, central compression.

Introduction

With a change in the design solutions of contour structures and the shells of thin-walled spatial coatings, the joint operation of shells with contour structures changes. The following are the inspection tasks that affect the joint operation of shells and contour structures of thin-walled spatial coatings:

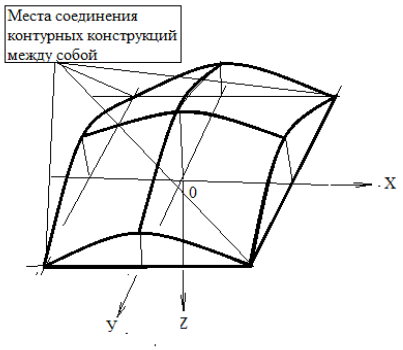
The contour beam (diaphragm) is subjected to central compression and to investigate how much compression force is transferred to the shell and how it spreads over the surface of the shell. In this case, the diaphragm and the shell are made in one piece. The tension of the reinforcement should be carried out with a tension on the concrete;

After prestressing, apply a uniformly distributed load to the shell and determine how much compression the shell experiences from the compression force and from the uniformly distributed load (biaxial compression to which, on the one hand, compression from the compression force of the contour diaphragm is added). This raises the question of an unexplored gap - how to consider the calculation scheme;

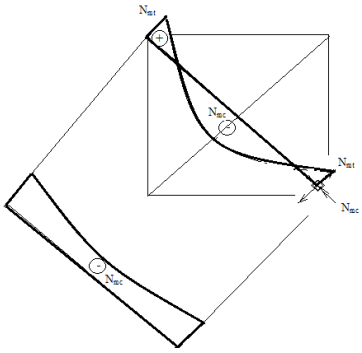
To manufacture contour diaphragms in a prefabricated version with the tension of the reinforcement on the stops and investigate the stress-strain state of the shells without connecting the contour diaphragms to each other. From the impact of an external load q, the lower belt of the diaphragm works in central tension, and the upper belt in compression. In our opinion, the compressive forces of the upper belt of the diaphragm must be additionally compressed by the shell plates. This factor has not yet been studied in scientific studies[1-17];

If diaphragms (beams) are connected to each other in places of support on the column, then how does the stress-strain state of the shell change. See drawing 1;

In this case, it is necessary to study the corner zones of the shells, since tension in one direction reduces the compressive strength in the other. A study is required completely before the formation of a crack and after its formation, since after the formation of a crack, the concrete continues to work in tension, it reduces the compressive strength of concrete in the other direction. In this case, it is required to study the question of how much it reduces the strength of the corner zones of shells in compression before the formation of a crack and after its formation. Angular zones of the shell are examined with and without prestressing. See drawing 2.



Drawing 1. Connections of contour structures to each other to study their joint work with shells



Drawing 2. Biaxial stress-strain state of the corner zones of shells due to a change in the design solutions of contour structures

The above questions also need to be considered in the bending state;

The question of the overall stability of the shell has not been brought to an end. In the norms and instructions for spatial structures, the issue of stability of the shell from local loads is considered. What will happen if there are no local loads?;

In the instructions of NIIZhB, in the appendix, some considerations of Professor A.A. Gvozdev are given, which say that due to the deformation of shrinkage and creep, the deformability of concrete increases and the fictitious modulus of elasticity decreases several times (about four times). The issue of overall sustainability is not clear, how to solve it is still unknown[17-29];

Why does concrete collapse in the transverse direction from the action of compressive forces? The textbooks contain the views of Professor E.E. Sigalov. In fact, it is not. At the suggestion of Professor V.N. Baikov, concrete continues to work after reaching the limiting stress values. After the compressive stresses reach their limit value, the tensile deformations begin to outstrip the compressive stresses and the tensile stresses increase to the boundary (limiting, final) value and the concrete is destroyed. Since concrete continues to work and after reaching the maximum value of compressive stresses, it can be considered as an orthotropically deformable material.

Conclusion

With a change in the design solutions of the contour structures of the contour diaphragms, the stress-strain state of the contour structures and shells changes due to their joint work. These factors are a gap in the scientific literature and remain to be explored.

List of References

[1]. Abobakirova Z. A., Bobofozilov O. Ispolzovanie shlakovых vyajuщix v konstruktsionnых solestoykix betonax //international conferences on learning and teaching. – 2022. – T. 1. – №. 6..

[2]. Abobakirova Z. A., Bobofozilov O. Remont betonnogo pola–vidы povrejdeniy i merы po ix ustraneniyu //international conferences on learning and teaching. – 2022. – t. 1. – №. 10. – s. 32-38..

[3]. Abobakirova, Z. A. (2021). Regulation Of The Resistance Of Cement Concrete With Polymer Additive And Activated Liquid Medium. The American Journal of Applied sciences, 3(04), 172-177.

[4]. Asrorovna A. Z. Effects Of A Dry Hot Climate And Salt Aggression On The Permeability Of Concrete //The American Journal of Engineering and Technology. – 2021. – T. 3. – №. 06. – S. 6-10.

[5]. Abobakirova Z. A. Regulation Of The Resistance Of Cement Concrete With Polymer Additive And Activated Liquid Medium //The American Journal of Applied sciences. – 2021. – T. 3. – №. 04. – S. 172-177.

[6]. Akhrarovich A. X., Mamajonovich M. Y., Abdugofurovich U. S. Development Of Deformations In The Reinforcement Of Beams With Composite Reinforcement //The American Journal of Applied sciences. – 2021. – T. 3. – №. 5. – S. 196-202.

[7]. Goncharova N. I., Abobakirova Z. A., Kimsanov Z. Technological Features of Magnetic Activation of Cement Paste" Advanced Research in Science //Engineering and Technology. – 2019. – T. 6. – №. 5.

[8]. Kimsanov Z. O., Goncharova N. I., Abobakirova Z. A. Izuchenie texnologicheskix faktorov magnitnoy aktivatsii tsementnogo testa //Molodoy uchenыy. – 2019. – №. 23. – S. 105-106.

[9].Goncharova N. I., Abobakirova Z. A. RECEPTION MIXED KNITTING WITH MICROADDITIVE AND GELPOLIMER THE ADDITIVE //Scientific-technical journal. – 2021. – T. 4. – №. 2. – S. 87-91

[10].Goncharova N. I., Abobakirova Z. A., Mukhamedzanov A. R. Capillary permeability of concrete in salt media in dry hot climate //AIP Conference Proceedings. – AIP Publishing LLC, 2020. – T. 2281. – №. 1. – S. 020028.

[11].Umarov, S. A. (2021). Development of deformations in the reinforcement of beams with composite reinforcement. Asian Journal of Multidimensional Research, 10(9), 511-517.

[12].Умаров, Ш. А. (2021). Исследование Деформационного Состояния Композиционных Арматурных Балок. TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 1(6), 60-64.

[13]. Abdugofurovich, U. S. (2022). BONDING OF POLYMER COMPOSITE REINFORCEMENT WITH CEMENT CONCRETE. Gospodarka i Innowacje., 24, 457-464.
[14]. Абдуллаев, И. Н., Умирзаков, З. А., & Умаров, Ш. А. (2021). Анализ Тканей В Фильтрах Систем Пылегазоочистки Цементного Производства. TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 1(6), 16-22.
[15]. Davlyatov, S. M., & Kimsanov, B. I. U. (2021). Prospects For Application Of Non-Metal Composite Valves As Working Without Stress In Compressed Elements. The American Journal of Interdisciplinary Innovations Research, 3(09), 16-23.
[16]. Умаров, Ш. А., Мирзабабаева, С. М., & Абобакирова, З. А. (2021). Бетон Тўсинларда Шиша Толали Арматураларни Қўллаш Орқали Мустаҳкамлик Ва Бузилиш Ҳолатлари Аниқлаш. TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 1(6), 56-59.
[17].Тошпулатов, С. У., & Умаров, Ш. А. (2021). ИНСТРУМЕНТАЛЬНО-УЧЕБНО-ДИНАМИЧЕСКИЕ ХАРАКТЕРИСТИКИ СРЕДНЕЙ ШКОЛЫ И КОНСТРУКТИВНЫЕ РЕШЕНИЯ СРЕДНЕЙ ШКОЛЫ№ 2 Г. ФЕРГАНЫ. TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 1(6), 10-15.
[18]. Mamazhonovich, M. Y., Abdugofurovich, U. S., & Mirzaakbarovna, M. S. (2021). The Development of Deformation in Concrete and Reinforcement in Concrete Beams Reinforced with Fiberglass Reinforcement. Middle European Scientific Bulletin, 18, 384-391.
[19]. Набиев, М. Н., Насриддинов, Х. Ш., & Кодиров, Г. М. (2021). Влияние Водорастворимых Солей На Эксплуатационные Свойства Наружные Стен. TA'LIM VA RIVOJLANISH TAHLILI ONLAYN ILMIY JURNALI, 1(6), 44-47.
[20]. Hasanboy o‘g‘li, A. A. (2022). Stress Deformation of Flexible Beams with Composite Reinforcement under Load. American Journal of Social and Humanitarian Research, 3(6), 247-254.
[21]. угли Ахмадалиев, А. Х., & угли Халимов, А. О. (2022, May). КОМПОЗИТНОЕ УСИЛЕНИЕ ИЗГИБАЮЩИЙ БАЛК ПОД НАГРУЗКОЙ. In INTERNATIONAL CONFERENCES ON LEARNING AND TEACHING (Vol. 1, No. 7, pp. 409-415).
[22].Сон, Д. О., & Халимов, А. О. (2021). УПРАВЛЕНИЕ МЕТРОЛОГИЧЕСКИМИ РИСКАМИ КАК ОСНОВА ДЛЯ УВЕЛИЧЕНИЯ КАЧЕСТВА ПРОДУКЦИИ. Экономика и социум, (2-2), 202-210.
[23]. Бахромов, М. М. (2020). Исследование сил негативного трения оттаивающих грунтов в полевых условиях. Молодой ученый, (38), 24-34.
[24]. Бахромов, М. М., & Раҳманов, У. Ж. (2020). Проблемы строительства на просадочных лессовых и слабых грунтах и их решение. Интернаука, (37-1), 5-7.
[25]. Mirzaeva, Z. A. (2021). Improvement of technology technology manufacturing wood, wood with sulfur solution. Asian Journal of Multidimensional Research, 10(9), 549-555.
[26]. Мирзаева, З. А. К., & Рахмонов, У. Ж. (2018). Пути развития инженерного образования в Узбекистане. Достижения науки и образования, 2(8 (30)), 18-19.
[27].Абобакирова, З. А., & кизи Мирзаева, З. А. (2022, April). СЕЙСМИК ҲУДУДЛАРДА БИНОЛАРНИ ЭКСПЛУАТАЦИЯ ҚИЛИШНИНГ ЎЗИГА ХОС ХУСУСИЯТЛАРИ. In INTERNATIONAL CONFERENCES ON LEARNING AND TEACHING (Vol. 1, No. 6, pp. 147-151).