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The contribution of solar radiation to the heat balance of a high-rise building in the summer period using the Lakhta Center as an example

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High-rise buildings; Enclosure Structure; Heat transfer; Convective; Facades; Double Glazing; Buffer Zone; Thermal Surpluses; Aeration; Actinometric Measurement; Solar Radiation; Energy Efficiency

Abstract:

The object of research is the thermal regime of a high-rise building (the Lakhta Center) equipped with modular double-skin facade structures with buffer zones. **Method**. A comprehensive approach was used, which included the development of a numerical model of the buffer zone and conducting field observations with the use of an actinometric station for accurate measurement of solar radiation parameters. **Results**. It was shown that solar radiation has a substantial impact on the building's thermal regime in the summer. The maximum recorded temperature in the buffer zone reached +54°C. The obtained results confirm the significant contribution of solar radiation to the heat and mass transfer processes within the buffer zone of a skyscraper with a transparent facade.

1 Introduction

2 Materials and Methods

3 Results and Discussion

4 Fundings

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References

References must meet the requirements https://unistroy.spbstu.ru/en/references/.

Nemova, D.; Olshevsky, V.; Gorshkov, A.; Kotov, E.; Kilbas, S.
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