

## STRESZCZENIA

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### **COMPARISON OF PHOTOGRAMMETRY AND LASER SCANNING METHODS ON THE CHOSEN ARCHITECTURAL OBJECT**

Digitization of documentation of white cards is currently a key aspect of preservation of national heritage. Destructive processes of archival documentation, escalation of acts of vandalism, consequences of war operations that have left their stamp on architectural objects as well as monuments of nature contributed to adaptation and introduction of the fifth form of national heritage, which is "digitization". Digitization shall ensure the re-creation of not only lost national treasures in the future, but also shall enable researchers in architecture, archeologists, historians, conservators a research and an analysis of chosen objects and records related to it in a non-invasive and interactive way. Objects subject to digitization will be able to be analyzed more thoroughly since digital data rendered available by electronic means shall enable and facilitate an interdisciplinary research process. In the article, the author presents results that compare two methods for digitization of the chosen architectural object. Documentation consists in recording and preserving of the fragment of façade and the chosen architectural detail of the considered object. The object subject to analysis is the "Tenement under the singing frog" built in 1889–90 acc. to the project by Teodor Marian Talowski, in Kraków at Retoryki 1 St. For an analyzed example, research has consisted in application of photogrammetry and laser scanning methods to acquire information on spatial geometry of researched object and compare discrepancies of newly generated 3D models.

The object presented has undergone a comparative analysis, based on which the key aspects have been isolated and then demonstrated in a graphic way, as well as specific issues related to them, such as precision and effect of distortion have been discussed. The objective of the work has been presentation of possibilities of practical application of photogrammetry as a cheaper method of digitization of architectural objects in relation to scanning method, applicable in digitization and preservation of national heritage consisting in development of new interactive documentation (white card).

**Keywords:** digital image, inventory of monuments, digitization, white card, 3D documentation, discrepancy

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### **PRELIMINARY ASSESSMENT OF A FLAT ROOF RADIATION ON RADIATIVE HEAT GAINS OF NEARBY WINDOWS – A CASE STUDY**

This paper presents the results of preliminary assessment of radiative heat flux received by selected windows from tar paper coated flat roof of the adjacent building. This study was conducted on an actual object: building "P" at the University of Technology in Rzeszów. Windows located on south-western elevation of "P" building are subjected to thermal and diffused solar radiation, coming from a flat roof of a nearby gym. It was suspected, that this extra heat flux may have significant

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influence on compartment overheating, that is observed by occupants of “P” building. For the purpose of this study, various atmospheric data, such as temperatures, solar irradiance and wind speed were collected on site. In order to gain more detailed insight into investigated problem, Finite Elements model of occurring phenomenon was developed. FE modelling along with calculations of necessary view factors were performed in Matlab 2019a. Our study demonstrated, that analysed windows receive twice the heat gains from the flat roof, that they would have received from grass covered ground surface in absence of the gym. It has been concluded, that the proximity of the flat roof with bituminous cover considerably influences radiative heat gains of the windows, especially these located at lower floors and the phenomenon seriously contributes to overheating of the compartments in studied building.

**Keywords:** thermal radiation, flat roof, view - factor, diffused radiation, radiative heat flux

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## **USE OF QUANTITATIVE AND QUALITATIVE WASTEWATER MONITORING IN WATER PROTECTION ON THE EXAMPLE OF LODZ**

Widely understood protection of water, and in particular surface waters, most exposed to direct pollution, requires many operations carried out both in the catchment area and in sewage systems as well as wastewater treatment plants. Due to its character and working conditions, it should be monitored not only in terms of hydraulics, but also in terms of the quality of transported wastewater. During atmospheric precipitation, large volumes of domestic and industrial wastewater as well as rainwater in various proportions flow through the canals, changing not only their quantity but also their composition. In such cases, the issue of monitoring becomes particularly vital. The article presents an analysis of the needs and tasks resulting from the application of quantitative and qualitative monitoring in the assessment of the functioning of sewage systems. Methods and tools used in Lodz that may be useful in water protection are presented. The benefits of using this type of solutions as well as the limitations and difficulties are discussed.

**Keywords:** sewer system, wastewater monitoring, rainfall monitoring, predictive model

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## **COMPARISON OF METHODS OF TESTING RESISTANCE TO PERMANENT DEFORMATION OF MASTIC ASPHALT**

The most common method to assess the resilience of mastic asphalt to permanent deformation is the static stamp indentation. The test is relatively simple and fast, but does not sufficiently differentiate of hard mixes. The paper presents a method to improve assess of asphalt concrete mixtures resistance on plastic deformations – indentation with dynamic stamp. The article describes the methodology of the test and interpretation of the results. Our study was performed on a mixture of mastic asphalt MA8 with the addition of natural asphalt TLA (Trinidad Lake Asphalt). The study achieved a sufficient correlation

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between the results of the static and dynamic test. It was also found that the dynamic indentation differentiates more detailed mixtures in terms of resistance to permanent deformation than static indentation test.

**Keywords:** static indentation pin, dynamic indentation pin, mastic asphalt, deformation

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## **IMPORTANCE OF ARCHITECTURAL DESIGN OF HEALTH-AFFIRMING URBAN PLACES. ASSESSMENT OF THERAPEUTIC QUALITIES OF ZAC CLICHY-BATIGNOLLES IN PARIS**

The presence of health – affirming everyday urban places is an invaluable asset for every neighborhood. The study presented encompassed the Post-Occupancy Evaluation of the therapeutic qualities of the urban tissue of certified eco-neighborhood in France. To perform this assessment the ready-to-use tool developed by the author, the universal pattern of design for health-affirming urban places was used. This study included the evaluation of the therapeutic qualities of Martin Luther public park located in the center of this neighborhood together with assessment of streets and paths leading to the park. The results were estimated as satisfactory. The architectural design of modern, human-oriented eco-neighborhood with centrally located public park lead to the creation of health-affirming urban place.

**Keywords:** therapeutic landscape, sustainable city, health and well-being, Universal Pattern of Design

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## **BUILDING INFORMATION MODELLING AND COPYRIGHT**

Building Information Modeling (BIM) translated directly into Polish means modeling information about a building. BIM is used in the planning, design, management and implementation of construction, and – ultimately – in building management. In addition, BIM allows simultaneous cooperation of many people on one project. However, the question arises whether models created using this technology are protected by law. One of the most important issues related to BIM, and particularly models created using this technology, is the protection of copyright, which is why these issues are discussed in more detail in this article.

**Keywords:** real estate, BIM, proptech, copyrights, work

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