

LIFE CYCLE MANAGEMENT OF CONSTRUCTION FACILITIES

THE LIFE CYCLE OF GREEN BUILDINGS AND THEIR CONTRIBUTION TO SUSTAINABLE URBAN DEVELOPMENT

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The article presents a comprehensive analysis of the life cycle of green buildings as a key element of the sustainable development of modern cities. The study reveals a five-stage model (design, construction, operation, reconstruction, disposal), emphasizing innovative approaches at each stage of the life cycle. Special attention is paid to the comparative analysis of the environmental, economic and social advantages of green buildings in comparison with traditional construction practices.

Keywords: green buildings, life cycle, sustainable development

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DEVELOPMENT OF A METHODOLOGICAL FRAMEWORK AND THE PRINCIPLES OF OPEN SUSTAINABLE ARCHITECTURE

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Currently, an active state policy in the field of urban planning is being implemented, aimed at the development of sustainable architecture in Russia, which is being implemented in the form of sustainable and integrated territorial development. "Green" construction standards are actively developing, and regulations are being adopted in the field of the construction of environmentally and energy-sustainable buildings. The purpose of this strategy is to create a comfortable living environment for people and rational use of resources, in particular, to increase the energy efficiency of capital construction facilities throughout all stages of the life cycle of facilities. These challenges require the revision of a number of terms, the development of new assessment methods and criteria. The article analyzes and improves the conceptual framework in the field of sustainable architecture and life cycle. In particular, the concept of an open sustainable architecture is introduced, its concept is disclosed, and the basic principles are outlined. A number of estimated indicators have been formed, in particular, the coefficient of investment and environmental sustainability and the entropy of energy efficiency (an indicator of the growth of energy loss, energy chaos of an object). The life cycle of capital construction facilities should be understood as the period of compliance of the building with the taxonomy of sustainability and the principles of open sustainable architecture, which can be extended through renovation, redevelopment or other appropriate measures.

Keywords: the life cycle of a real estate object, sustainable architecture, integrated territorial development, federal project, "green" standards, multi-family residential buildings, energy efficiency of buildings, entropy of the system.

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THE CONCEPT OF RURAL TOURISM IN RUSSIA ON THE EXAMPLE OF THE VILLAGE OF MARYINO, KURSK REGION

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This article examines the role and importance of rural tourism in Russia. The factors of this type of recreation for the economy, as well as its positive aspects, are analyzed. The tourist route Kursk-Rylsk was considered. The Marino Manor has been studied in detail as an object and monument of federal significance. The history, architecture and main attractions of this place were described.

Keywords: rural tourism, rural area, tourist route, architectural monument.

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TECHNOLOGY AND ORGANIZATION OF CONSTRUCTION

INVESTIGATION OF THE CAUSES OF DEFECTS IN BUILDINGS DUE TO LONG-TERM OPERATION DURING CONSTRUCTION AND TECHNICAL EXPERTISE

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The article analyzes the appearance of defects in buildings during their long-term operation. The intensity of defects depends on the loads and conditions of maintenance of the construction site, the impact of natural forces on it, such as temperature, humidity, etc. It is confirmed that late completion, non-compliance with the technological requirements of repairs and ineffective control during the operation of the construction facility leads to defects and shortens the service life of the building. The article notes that if you notice signs of damage in a timely manner, you can take preventive measures in time and extend the operation for many years.

Keywords: construction and technical expertise, building wear, defects, repairs, reliability, efficiency

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INSPECTION OF STEEL STRUCTURES DURING CONSTRUCTION AND TECHNICAL EXPERTISE

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The key aspects of the inspection of steel structures in the framework of the construction and technical expertise are considered. With an increase in the service life of buildings and structures, as well as under the constant influence of external factors, the issue of assessing the condition of steel structures becomes especially relevant. The safety and durability of construction facilities directly depend on timely detection of defects and assessment of their impact on operational characteristics. Non-destructive testing methods such as ultrasound, magnetic powder and radiographic, as well as visual and instrumental examinations are discussed.

Keywords: construction and technical expertise, steel structures, inspection methods, control, deformation, corrosion

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THEORETICAL STUDIES OF WOODEN BRIDGE BEAMS REINFORCED WITH CARBON FIBER TAPE

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The calculation studies of wooden bridge beams reinforced and unreinforced with carbon fiber tape were carried out. The calculations were performed in the LIRA SAPR PC. A general calculation for static (force, temperature, deformation) and dynamic effects (vibrational, seismic) is presented. Various combinations of loads and efforts are determined, calculation schemes of the first and second loading of a wooden bridge beam are constructed, force diagrams are presented, and the oscillation period, circular, natural and forced frequency and oscillation amplitude are indicated.

Keywords: wooden bridge beam, reinforcement, carbon fiber tape, dynamic load, static load.

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URBAN PLANNING, PLANNING OF RURAL SETTLEMENTS

ANALYSIS OF THE CURRENT STATE OF BICYCLE INFRASTRUCTURE AND THE PROSPECTS OF ITS DEVELOPMENT IN THE CITY OF VORONEZH

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This article discusses the current issues of designing a network of bicycle paths in Voronezh. An empirical study was conducted - an author's sociological survey to determine public opinion about the current state of the network of bike paths with bicycle infrastructure, and the target audience of bicycle route users, as well as directions and prospects for the development of bicycle routes, were identified. According to the analysis of the current state of the cycling infrastructure, the main problems of the development of cycling routes have been identified, which are associated with insufficient safety, ease of use and short length. Based on a secondary analysis of the results of monitoring the condition of cycling infrastructure, a characteristic of the level of development of cycling infrastructure in Voronezh is given: the city has a low level of bicycle routes and connectivity of bike paths and bike lanes. Based on the conducted pre-design analysis, a variant of the bicycle route network is proposed.

Keywords: bicycle infrastructure, bicycle, transport, road transport system, bicycle route.

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DEVELOPMENT OF CONCEPTS FOR IMPROVEMENT OF RECREATIONAL AREAS OF THE CITY OF VORONEZH BASED ON THE PRINCIPLE OF FUNCTIONAL ZONING

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A study of the principles of zoning park spaces aimed at optimizing their recreational potential was conducted. During the analysis of key recreation areas in Voronezh, the current level of landscaping of territories and the imbalance in the distribution of functional areas (sports, children's, quiet areas) were identified. A concept was developed where priority was given to segmentation of space - separate clusters for active recreation, educational programs and meditative practices. This minimizes the intersection of visitor flows and creates an inclusive environment for all ages.

Keywords: concept, landscaping, recreational area, park, functional zoning, technical and economic indicators.

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CADASTRAL WORKS IN RELATION TO THE CONSTRUCTION OF THE SCULPTURE COMPOSITION "BATTLE OF KURSK" FOR INCLUSION IN THE EGRN DATABASE.

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The article is devoted to the cadastral work carried out to form the technical plan of the construction of the sculpture composition "Battle of Kursk", located in the Kursk region. The stages of cadastral activity are described, including preparatory, field and desk work, as well as the use of the ARGO software package for creating documents. Special attention is paid to modern methods such as 3D scanning using the FARO FOCUS 3D X330 device and data processing in the Trim program.

Keywords: cadastral works (KR), real estate object (OH), technical plan (TP), State Cadastral Registration (GKU), Unified State Register of Immovable Property (USRN), 3D scanning, laser scanning, cultural monument, public cadastral map (PKK), FARO FOCUS 3D X330, Trimble RealWorks, ARGO software package, boundary plan (MP), Rosreestr, sculpture composition "Kursk bitva", coordinates,

point cloud.

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GIS TECHNOLOGIES IN THE FORMATION OF AN URBAN PLANNING STRATEGY FOR EDUCATIONAL AND INNOVATIVE SPACES IN DEGRADED INDUSTRIAL AREAS OF THE CITY

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The article presents the results of an urban planning analysis performed using geographic information systems (GIS), aimed at assessing the territorial potential of an abandoned industrial site for the subsequent design of a business incubator in the city of Lipetsk. A comprehensive study of the urban

environment has been conducted, including an analysis of the functional structure of the city, the administrative district and the directly selected territory. The study examined key points of attraction, as well as the state of social, economic, cultural, entertainment and transport infrastructure. Based on the analysis, a conceptual landscaping plan has been developed, including the allocation of functional areas, the layout of coverings, landscaping systems and the arrangement of small architectural forms. The results obtained can be used in the practice of sustainable urban development and revitalization of degraded industrial areas.

Keywords: urban planning analysis, business incubator, revitalization

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ANALYSIS OF THE TERRITORIAL LOCATION OF UNIVERSITY CAMPUS BUILDINGS AND OPTIMIZATION OF SPATIAL PLANNING USING THE EXAMPLE OF VORONEZH STATE UNIVERSITY

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This article provides an urban planning analysis of the location of VSU infrastructure facilities. A proposal has been developed for organizing interaction between the city's university buildings, aimed at reducing the territorial fragmentation of educational facilities.

Keywords: university campuses, dormitory, infrastructure, accessibility, dispersion.

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ENVIRONMENTAL SAFETY OF CONSTRUCTION AND URBAN ECONOMY

FIRE-FIGHTING SPATIAL PLANNING SOLUTIONS AND MATERIALS FOR HIGH-RISE BUILDINGS

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Against the background of the growing number of storeys of urban buildings, the existing technical means of evacuation and extinguishing fires are partially exhausting their capabilities. An alternative in these conditions is the improvement and development of space-planning solutions for buildings as a means of their fire safety. It is proposed to use horizontal evacuation routes, which are arranged in the form of closed galleries on the roof or inside the upper technical floors. For their successful operation, the use of materials with high fire resistance is necessary.

The results of experimental study of compression strength of steel fibre-concrete samples with fiber content of 1.5% by volume after exposure to high temperatures are presented. It has been shown that the compression strength of steel fiber concrete samples, after exposure to 230°C temperatures, is higher than that of concrete samples. At the same time, the compressive strength of concrete samples was slightly

higher than the strength of concrete samples after exposure to 230°C temperature. After heating the samples to 850°C during cooling, the samples almost completely collapsed.

Keywords: technical means of extinguishing, escape routes, horizontal gallery, steel-fiber concrete, high-temperature exposure, nature of destruction, strength of samples.

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THE USE OF THERMAL INDICATOR MATERIALS TO PREVENT FIRES IN ELECTRICAL EQUIPMENT

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Thermal indicator materials are not only a tool for rapid detection of overheating, but also an important element of a comprehensive fire safety system. Their implementation in the electrical industry can significantly increase the reliability of equipment, reduce operating costs and, most importantly, save lives.

Keywords: fire, fire safety, thermal indicator coatings, electrical insulation materials, thermochromic stickers, thermal pigments, thermochromic paints.

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ANALYSIS OF DAMAGE FROM UNAUTHORIZED PIPELINE INSERTION

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Accident-free operation of main pipelines is achieved by ensuring safety from external and internal threats. According to experts, the volume of stolen oil and oil products annually exceeds 5 million tons. This situation has become threatening for the fuel and energy complex of Russia, so many companies have begun to implement systems of continuous remote monitoring of the technical condition of the pipeline in order to reduce damage, as well as to ensure the safety of pipeline transport facilities.

This paper provides an assessment of the technical and economic damage from an unauthorized tapping into an oil product pipeline using a specific example. Shows the total losses in ruble equivalent from the illegally seized oil product.

Keywords: unauthorized tapping, damage, oil products, pipeline, losses, economic.

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TIME SERIES FORECASTING: IMPROVING LSTM MODELS WITH VECTOR-TEMPORAL ENCODING

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This paper proposes a method to improve the accuracy of time series forecasting using vector-temporal encoding to enhance LSTM models. It is shown that a simple unidirectional LSTM with proper temporal feature encoding can outperform complex architectures such as Bi-LSTM and CNN-LSTM. The importance of temporal data representation for neural network efficiency is emphasized. The method was tested on short-term electricity consumption forecasting (5-minute resolution, 24-hour horizon). A cloud-based interface for result visualization was also developed.

Keywords: time series forecasting, vector-temporal encoding, temporal data vectorization, forecasting accuracy improvement, forecasting infrastructure.

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