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**IMPLEMENTATION OF BUILDING INFORMATION MODELING (BIM) PRINCIPLES AND INFORMATION TECHNOLOGIES FOR STRUCTURAL ANALYSIS IN THE DESIGN OF REINFORCED CONCRETE AND COMPOSITE STEEL-REINFORCED CONCRETE FRAMED BUILDINGS**

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Oleh ROMANYSHEN*

**Summary.** The development of Building Information Modeling (BIM) in historical context has been analyzed, including CAD systems for 2D and 3D modeling, considered predecessors of modern BIM systems, parametric 3D modeling systems, the use of information technologies for structural analysis, issues of combined use of BIM systems and information technologies for structural analysis.

Using the example of a 20-story frame-mono-lithic residential building, the sequence of creating a building information model in PC SAPPHIRE, forming a calculation model of the reinforced concrete frame in PC Lira-SAPR through direct integration of the specified software complexes is demonstrated. The issues of preparing a building information model in PC SAPPHIRE for transfer to PC Lira-SAPR are discussed, as well as the issues of refining the calculation model in PC Lira-SAPR, including assigning stiffness and load characteristics, and selecting reinforcement for structural elements. The sequence of creating a calculation model of a steel-reinforced concrete frame for three options of steel-reinforced concrete columns is considered: tubular concrete columns; tubular concrete columns with rigid reinforcement by cross steel strips; tubular concrete columns with rigid reinforcement by cross double T-sections.

For the selected most loaded columns, mainly on the first floor, operating under the conditions of central or off-center compression, the sequence of forming refined calculation models is demonstrated by modeling these columns and areas of their connection to the floor slabs with 3D finite elements. Equivalent stress iso-surfaces are provided, as well as separate iso-surfaces of equivalent stresses of the steel shell and separately the concrete core of the columns.

**Keywords:** BIM; BIM technologies; information modeling; 3D modeling; reinforced concrete structures; composite steel-reinforced concrete structures; reinforced concrete frame buildings; composite steel-reinforced concrete frame buildings

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