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Evolution of Simulation Techniques to Meet Project Methods and Objectives

KRISHNAJI PAWAR - CEO & FOUNDER

LEED AP(BD+C),GSAS CGP,GCP,ISO 14001

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APPLICATIONS OF ENERGY MODELS FOR BUILDINGS

Identifying analysis objectives is crucial for effective simulation, as it ensures relevance and efficacy. For example, an architecture firm might design a new office building with energy consumption analysis, thermal comfort evaluation, and light optimization. Customizing simulations for changes in building use ensures they remain relevant and accurate despite alterations in building use.

Learning Objectives

- Introduction and Course Outline
- Simulation Comparisons
- Modeling Energy Performance
- Evolution of Simulation Techniques
- Baseline Building Models
- Communicate Analysis Results
- Collaborate Within Project Teams
- Applications of Energy Models for Building
- Case Study: Application of BEM
- Summary and Resources
- BEMP Practice Test V.5.1



INTRODUCTION

- Identified analysis objectives are crucial for effective simulation.
- Customization for changes in building use ensures relevance and accuracy.
- Adaptation to project phases includes conceptual design, detailed design, construction, and operation.
- Selection of appropriate methods and procedures is crucial for achieving desired project outcomes.
- Comparative analysis of simulation methods includes Monte Carlo simulations, Agent-Based Modeling (ABM), and Finite Element Analysis (FEA).
- Flexibility in method selection allows the project team to respond to new findings, stakeholder feedback, or challenges while maintaining alignment with project objectives.

INTRODUCTION TO SIMULATION TECHNIQUES

- Simulation techniques have evolved due to advances in computational power, software development, and project complexity.
- The need for simulation methods that accurately model real-world phenomena and predict outcomes has become imperative.



IDENTIFYING ANALYSIS OBJECTIVES

- The foundation of effective simulation lies in the clear identification of analysis objectives.
- Examples include Energy Consumption Analysis, Thermal Comfort Evaluation, and Light Optimization.
- Clarity in objectives ensures the simulation aligns with stakeholder expectations and facilitates the selection of appropriate methodologies.



CUSTOMIZING SIMULATIONS FOR CHANGES IN BUILDING USE

- Simulations must be adaptable to changes in building functions.
- Examples include adjusting for occupancy patterns, lighting needs, and furniture layout.
- Customizing simulations helps predict energy use, occupant comfort, and operational efficiency in remodeled buildings.



ADAPTING SIMULATIONS TO THE PROJECT PHASE

- Each phase of the project lifecycle requires tailored simulation approaches.
- Examples include structural analysis during conceptual design, detailed design, construction, and operation.

Selecting Appropriate Methods and Procedures

- The selection of simulation methods and procedures is crucial for achieving desired project outcomes.
- Comparative analysis of simulation methods includes Monte Carlo Simulations, Agent-Based Modeling (ABM), and Finite Element Analysis (FEA).
- Flexibility in method selection ensures the project team can respond to new findings, stakeholder feedback, or unexpected challenges.



CONCLUSION

- The evolution of simulation techniques reflects the increasing complexity and diversity of contemporary projects.
- By identifying analysis objectives, customizing simulations for changes in building use, adapting to project phases, and selecting appropriate methods and procedures, project teams can harness the power of simulation to enhance decision-making, optimize design, and achieve project success.



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CONTACT US



+91 6363032722



info@beyondsmartcities.in



learn.beyondsmartcities.in



#55,HMR Layout ,Bengaluru ,India

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