Building Energy Simulation

A Workbook Using DesignBuilder™

Vishal Garg, Jyotirmay Mathur, Surekha Tetali and **Aviruch Bhatia**

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Preface

The *Building Energy Simulation: A Workbook Using DesignBuilder*™ is an outcome of a series of training programs conducted for participants with varied backgrounds. The authors experimented with various teaching techniques and arrived at the conclusion that the most effective method of imparting these training programs is through tutorials and step-by-step instructions along with graphical illustrations.

The simulations in this workbook are performed using the DesignBuilder™ software for illustration purpose to help explain the aspects of a whole building energy simulation process. This workbook adopts the 'learning by doing' principle to explain the fundamentals of building physics and building services, and in turn help participants understand the concept of building energy performance. Based on participant feedback during the training programs, the authors decided to use EnergyPlus™ with DesignBuilder as the front end to explain the simulation process.

The book has been organized as follows:

- The first ten chapters of this workbook cover various aspects of simulation, such as creating the building geometry, assigning material and equipment and analysing the results.

- Chapter 11 explains simulation for the whole building performance method of the ASHRAE 90.1 standard.
- Chapters 12 through 14 provide exercises to simulate three different building projects.

The authors would highly appreciate any feedback or suggestions for improving this workbook.

Acknowledgements

The authors thank all those who helped during the research, writing, review and editing process, which immensely contributed in making this workbook a reality.

We would like to start by thanking all professionals, researchers and students from all over the globe for providing their feedback during the various building simulation training programs that were conducted in the past few years. This feedback helped us improve the building simulation teaching methodology and motivated us to create this workbook.

We thank Prof. N. K. Bansal who not only introduced us to this subject of building science but also served as our role model in learning the art and science of the teaching process.

We are also grateful to DesignBuilder Software Ltd., Stroud, UK for allowing us to develop this book and answering our queries during the writing process.

This workbook would not have been possible without all those reviewers who took time out to patiently go through the content and provide their valuable feedback. The authors would especially appreciate the contribution from Gaurav Choudhary, Hema Rallapalli, Ishita Sharma, Kopal Nihar, Sraavani Gundepudi, Shivraj Dhaka and all the students from International Institute of Information Technology (IIIT), Hyderabad, India and Malaviya National Institute of Technology (MNIT), Jaipur, India who reviewed this workbook and provided feedback on the technical content and its accuracy.

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