Eskom Power Series

Volume 12

Basic Engineering Toolbox

Who should read this book?

The book is intended for the practising engineer who is working at the level of concept or basic engineering in power generation projects.

BASIC ENGINEERING TOOLBOX

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What does this book cover?

The author has compiled six apps that he believes are applicable to an engineer working in the power generation environment. In each chapter fundamental theory is revised before the app is introduced. The apps are intended to be user friendly and are ideal for use when desktop work is undertaken, especially at the level of concept engineering. The six apps are as follows:

PipeFlow: Used for the analysis of simple and complex flow, including work transfer and major and minor losses. The tool is ideal for use by the engineer at the basic design level where losses are required to determine electrical loads for pumping, etc.

Engine: Used for all gas turbine and gas/diesel engine plant at the concept/basic design level where perhaps the power output is required for a certain fuel source or the fuel energy is required for a desired power output.

SteamPlant: Used to calculate the steam plant power output based on a coal specification that includes an analysis of the coal and volatiles as well as the ash. The calorific value of the coal sample is calculated and the effect of using wet coal is demonstrated.

WindAnalyse: This app takes raw data as received from site, does a comprehensive and complete analysis of the data in a single step and is in full compliance with IEC 61400-1. The tool is indispensible to any user at the phase of performing wind resource analysis and does not have bespoke software such as Windfarmer™.

SolarAngles: This app produces an accurate output for the solar azimuth and zenith angles based on a time, date, day, month and year input for a specific location, elevation, site temperature and pressure. This app is similar in terms of interface to the app 'Solar1'.

CSPPower: For a given direct normal irradiation value and desired plant output, this app generates the heliostat number as well as the total tower base thermal power required for a desired solar multiple. It is indispensible at the concept/basic design phase of the project. The app does not evaluate the plant capacity factor.

An additional chapter involving the effects of back pressure on open and combined cycle gas plant performance is also included. This chapter completes the book from a practical perspective.

Contents of the book:

Plus a Memory Stick Containing Apps and Video Outlining Apps

What other books are available?

Volume 1: The Planning, Design and Construction of Overhead Power Lines (pp 772), ISBN No. 978-0-620-33042-8

Volume 2: Fundamentals and Practice of Overhead Line Maintenance (pp 258), ISBN No. 0-620-30906-7

Volume 3: The Practical Guide to Outdoor High Voltage Insulators (pp 224), ISBN No. 0-620-31074-X

Volume 4: Inductive Instrument Transformers and Protective Applications (pp 860), ISBN No. 0-620-37865-4

Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers (pp 337), ISBN No. 978-0-620-38294-6

Volume 6 (Part 1): High Voltage Overhead Power Lines: Theoretical Calculations and Formulae for Conductor Installations (pp 349), ISBN No. 978-0-620-42834-7

Volume 6 (Part 2): High Voltage Overhead Power Lines: Theoretical Calculations and Formulae for Transmission Line Towers (pp 378), ISBN No. 978-0-620-46585-4

Volume 7: Corona in Transmission Systems: Theory, Design and Performance (pp 528), ISBN No. 978-0-620-49388-8

Volume 8: Power Quality in Electrical Power Systems: A Holistic Approach (pp 665), ISBN No. 978-0-9921781-2-3

Volume 9 (Part 1): HVDC Power Transmission: Basic Principles, Planning and Converter Technology (pp 832), ISBN No. 978-0-9921781-0-9

Volume 10: Thermodynamics for Students and Practising Engineers (pp 262), ISBN No. 978-0-992-17811-6

Volume 11: Thermal Sciences for Engineers (pp 302) – ISBN No. 978-0-992-17813-0

What books are in development?

• HVDC Power Transmission (Part 2)

• Power Station Chemistry Book

• High Voltage Overhead Power Lines: Construction Works

• Fly Ash Properties and Utilisation Book (Parts 1 to 6)

• Insulating Fluid for the Electrical Engineering Industry

• AC Substation Design Handbook

• Coal Classification and Utilisation Book

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