ELECTRIC POWER RESEARCH INSTITUTE

READY NOW

EPRI Transmission Line Reference Book: 115–345-kV Compact Line Design: The "Blue Book"

Extensively revised and updated, this new edition provides an essential, one-of-a-kind resource for utilities seeking to design, build, and maintain cost-effective and aesthetically acceptable compact lines.

The new *EPRI Transmission Line Reference Book: 115–345-kV Compact Line Design* (1013787) provides the most comprehensive and up-to-date technical information on the design and maintenance of compact overhead transmission lines. It will enable energy companies around the world to construct cost-effective, compact lines that produce optimal performance and to address the maintenance of compact lines while they are energized.

The new book is an updated version of the industry standard *EPRI Transmission Line Reference Book: 115–138-kV Compact Line Design*, commonly known as the "Blue Book," which was last published in 1978.

Application and Value

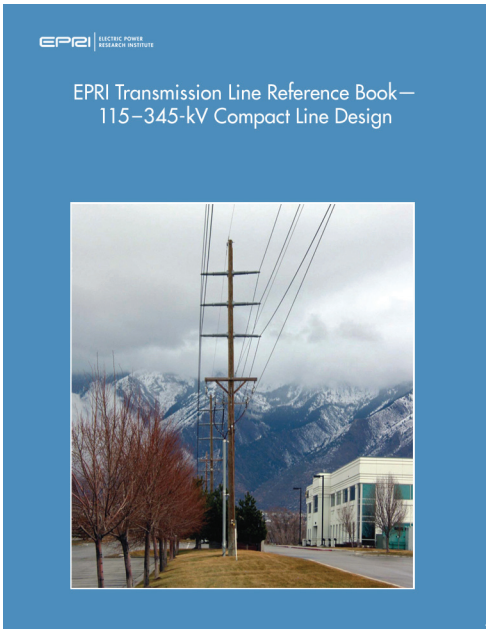
The new Blue Book gives today's transmission engineers ready access to the latest technical information and tools needed to develop reliable, safe compact line designs.

The Blue Book is offered as an electronic reference that can be accessed by an unlimited number of employees and is complemented by EPRI training courses, software, and supporting services. EPRI will publish a hardcover version in late 2008.

Compact Lines: Benefits and Challenges

Compact transmission lines were initially built to meet congested space requirements in urban areas. By reducing the separation between phases, a compact transmission line can be built on a narrow right-of-way or along a road similar to the construction of a distribution line. A compact 115-kV transmission line looks very much like a distribution line, which is common and generally accepted in urban areas.

Compaction provides distinct benefits, such as lower capital and maintenance costs, lower line losses, and a reduction in electric and magnetic fields. However, there are also challenges, including higher voltage gradients on conductors and insulators—resulting in higher audible noise, radio interference, increased hardware corona, and aging of composite materials. Other concerns include decreased lightning performance, live line maintenance practices, and mechanical issues such as conductor galloping and wind loadings.



The new Blue Book will help utilities to maximize the benefits and address the challenges of compact line design. As a practical tool, it offers designers a "tool kit" of options to consider. Because the book covers all of the relevant aspects of line design, it helps to address one of the key challenges facing a designer: the way that making a change in one area may result in unintended concerns in another area.

Audience

The Blue Book is intended for use by transmission line designers and staff responsible for the maintenance of overhead lines, interpretation of line failures, and correction of poor designs.

New Material and Organization

The content of the earlier edition has been significantly expanded and updated to reflect the latest in compact line design, including new technologies and methods and current utility needs and practices.

The result is a state-of-the-art reference guide for the design of compact overhead transmission lines. Areas covered include compact line research studies, the experience of utilities with

compact lines, conductor motion, the electrical performance of insulators, insulation for switching surges, lightning performance, corona and field effects, maintenance and safety issues, and the aesthetic and environmental aspects of compact lines. The book addresses those aspects of transmission line design that are relevant or unique to compact overhead lines and does not cover those areas of more general line design. Included are examples and calculations to demonstrate the concepts, making the book a practical tool for designers. This new edition also provides a number of features to increase its usefulness. Each chapter ends with a section of highlights, which summarizes key points. There is also a bibliography of related references and a glossary of key terms.

Two of the new chapters address areas not included in the first edition of the Blue Book. Chapter 2, Compact Line Experience, describes the significant compact line research studies conducted in North America and other parts of the world since the publication of the first edition. The chapter then presents case studies of eight utilities, recounting their experience in the design, construction, operation, and maintenance of new and upgraded compact transmission lines.

Chapter 9, Aesthetic and Environmental Aspects of Compact Lines, describes aesthetic issues related to compact lines, including the visual impact of structures and conductors and strategies for blending with the environment or presenting a "big and bold" appearance. The chapter also reviews environmental concerns affecting plants and wildlife that are pertinent to compact lines.

Training and Services

In addition to providing an essential reference to practicing engineers, the Blue Book can also serve as a basis for training new overhead transmission engineers and transmission line designers. To facilitate technology transfer, EPRI offers workshops and training seminars structured around the topics covered in the book and presented by experts in the field.

Table of Contents

Contact Information

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