

STATISTICAL
**QUALITY
CONTROL**
HANDBOOK



Western Electric

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**statistical
quality control
handbook**



This Handbook, as indicated in the "Foreword," was prepared to assist Western Electric people in performing Western Electric Company work. Others elsewhere may also think it useful as a guide for applying statistical quality control. The Handbook is not for sale through ordinary commercial channels.

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Western Electric

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Foreword

This book is a working Handbook prepared by Western Electric people for Western Electric use. Its primary purpose is to provide a guide for applying statistical quality control principles to the company's manufacturing and other operations.

The book was prepared under the guidance of a Handbook Committee appointed by the Manufacturing Division's Engineering Staff. The following persons have served, during all or part of the time, as members of the formal Committee:

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The chairman of the Writing Committee was Miss Bonnie B. Small.

Many engineers and supervisors have assisted in the writing, assembling and checking of this material. The names are so numerous that it is not possible to list them all. The Committee wishes to express its appreciation to all these individuals for contributing so much of their time, effort and material, and also for the excellent spirit of cooperation in which the work was done.

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It is with deep regret that it must be recorded here that two very active members of this group, Mr. Claude E. Adair and Mr. Fred H. Drummond, of the Indianapolis Works, lost their lives in an airplane accident on April 1, 1956 while on their way to a Handbook meeting. Both had made important contributions to the writing and planning. For this, as well as personal reasons, their loss has been keenly felt.

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A preliminary edition of this book was issued in September 1956. Many members of the Western Electric Company, and also of the Bell Telephone Laboratories, were kind enough to read it. The Committee wishes to express its appreciation for the many helpful comments, suggestions and criticisms. The contents of this volume, however, are entirely the responsibility of the Committee.

Preface by the Writing Committee

This book is not a textbook on Statistical Quality Control. It does not attempt to discuss quality control theory, nor is it a book of examples of quality control applications. It is intended primarily to be a description of those procedures which, if followed, will tend to preserve the essential features of the quality control programs at Western Electric. To a certain extent it may be looked upon as a compendium of the techniques and methods which have been found to contribute most to making these programs successful. Much of the material is based on training courses which have been given during the past six or seven years to Engineers, key people in the Shop and people at all levels of Management.

The book is written in non-technical language, and no attempt has been made to write for the professional statistician or the mathematician. The techniques described are essentially those which have been used in all types of industry since their development during the 1920's by Dr. Shewhart. Perhaps the most distinctive features of the Western Electric program are (a) the emphasis on Engineering and Operating applications rather than Inspection, and (b) emphasis on the control chart, and particularly the process capability study, as the foundation of the entire program.

The book also stresses the importance of the Quality Control Team as a means of putting the quality control methods to direct practical use.

On certain subjects, such as designed experiments and correlation, it has not been possible to give more than a brief discussion of principles and an explanation of some of the terminology. It was thought best to include this, however briefly, rather than to omit these subjects entirely. The material on acceptance sampling has purposely been kept brief, partly because of the emphasis on Operating and Engineering, and partly because the subject has been covered adequately elsewhere.

Much of this book has been written in the imperative form. This is to facilitate its use as a practical working Handbook. The fact that the book states that "samples should be taken this way" or that "patterns should be marked this way" should not be taken to imply that this is the only way to do it.

It should also be kept in mind that this book does not attempt, in any sense, to cover the entire field of Statistical Quality Control. It does describe certain procedures and methods which the Western Electric Company has found it desirable to emphasize in order to secure the wanted results from its quality control programs.

BONNIE B. SMALL
Chairman
Writing Committee

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