

IEEE Recommended Practice for the Maintenance of Industrial and Commercial Power Systems

IEEE Industry Applications Society

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Abstract: This recommended practice covers the maintenance of industrial and commercial power systems. It covers the fundamentals of electrical equipment maintenance, how to develop successful maintenance strategies, and the common testing methods used as part of an electrical equipment maintenance program.

Keywords: failure effect; failure mode; failure modes and effects analysis; failure modes, effects, and criticality analysis; hidden/latent failure; maintenance; predictive maintenance; preventive maintenance; probability; reliability; reliability-centered maintenance; safety-related work practices

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Introduction

This introduction is not part of IEEE Std 3007.2-2010, IEEE Recommended Practice for the Maintenance of Industrial and Commercial Power Systems.

IEEE P3000 Series

This recommended practice was developed by the Technical Books Coordinating Committee of the Industrial and Commercial Power Systems Department of the Industry Applications Society as part of a project to repackage IEEE's popular series of "color books." The goal of this project is to speed up the revision process, eliminate duplicate material, and facilitate use of modern publishing and distribution technologies.

When this project is completed, the technical material in the thirteen color books will be included in a series of new standards—the most significant of which will be a new book, IEEE Std 3000™, Recommended Practice for the Engineering of Industrial and Commercial Power Systems. The new book will cover the fundamentals of planning, design, analysis, construction, installation, start-up, operation, and maintenance of electrical systems in industrial and commercial facilities. Approximately 60 additional "dot" standards, organized into the following categories, will provide in-depth treatment of many of the topics introduced by IEEE Std 3000:

- Power Systems Design (3001 series)
- Power Systems Analysis (3002 series)
- Power Systems Grounding (3003 series)
- Protection and Coordination (3004 series)
- Emergency, Standby Power, and Energy Management Systems (3005 series)
- Power Systems Reliability (3006 series)
- Power Systems Maintenance, Operations, and Safety (3007 series)

In many cases, the material in a "dot" standard comes from a particular chapter of a particular color book. In other cases, material from several color books has been combined into a new "dot" standard. The material in this recommended practice largely comes from Chapter 5 and Chapter 6 of IEEE Std 902™-1998^a and Chapter 8 of IEEE Std 1446™-1995 [B29].^b

IEEE Std 3007.2

The research and analysis of the optimum maintenance program for electrical equipment have been ongoing tasks of the maintenance manager for as long as electrical equipment has been used to support facility or plant operation. In spite of the findings from decades of analysis, maintenance programs still vary from breakdown maintenance programs to sophisticated preventive maintenance programs. Preventive maintenance programs may include predictive maintenance as well as a more sophisticated reliability-centered program. The many variables, from the types of electrical equipment to the types of applications in which they are used, make the universal definition of an exact maintenance program difficult. It is believed almost universally, however, that some form of maintenance is necessary.

^a Information on references can be found in Clause 2.

^b The numbers in brackets correspond to the numbers of the bibliography in Annex A.

NFPA 70B-2006 [B45] states the following:

“Electrical equipment deterioration is normal, but equipment failure is not inevitable. As soon as new equipment is installed, a process of normal deterioration begins. Unchecked, the deterioration process can cause malfunction or an electrical failure.”

It is necessary to control equipment deterioration in order to maintain the use for which the equipment and systems were originally designed and installed. Although most parties would agree that preventive maintenance is necessary for the reliability of electrical power systems, there remains a wide disparity about the content of a preventive maintenance program.

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1. Scope

This recommended practice covers the maintenance of industrial and commercial power systems. It covers the fundamentals of electrical equipment maintenance, how to develop successful maintenance strategies, and the common testing methods used as part of an electrical equipment maintenance program.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEEE P3007.3TM/D1, April 2010, Recommended Practice for Electrical Safety of Industrial and Commercial Power Systems.^{1, 2, 3}

IEEE Std 902TM-1998, IEEE Guide for Maintenance, Operations and Safety of Industrial and Commercial Power Systems (*The Yellow Book*).

¹ Numbers preceded by P are IEEE authorized standards projects that were not approved by the IEEE-SA Standards Board at the time this publication went to press. For information about obtaining drafts, contact the IEEE.

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