Z463-18
National Standard of Canada

Maintenance of electrical systems

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Standards Council of Canada
600-55 Metcalfe Street
Ottawa, Ontario, K1P 6L5
Canada

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D. Shanahan	CSA Group, Toronto, Ontario	*Project Manager*

Preface

This is the second edition of CSA Z463, *Maintenance of electrical systems.* It supersedes the first edition, published in 2013 as a guideline.

This Standard specifies basic requirements on maintenance of electrical systems based on principles of loss control and safety management systems. It also provides guidance on the selection of reference standards, equipment-specific maintenance procedures, and the assessment of electrical equipment to verify correct function.

In addition to converting many previous advisory criteria into mandatory requirements, the following is an overview of the major revisions from the 2013 edition:

a) The Scope has been modified to indicate that the Standard does not currently apply to telecommunication networks and electrical utility generation, transmission, and distribution systems.
b) Definitions have been updated in accordance with the 2018 edition of the *Canadian Electrical Code, Part I*, as well as other CSA Group, IEEE, NEMA, and NETA standards.
c) Clause 4 (Electrical maintenance program) has been revised to include prevention of equipment damage and property loss as objectives (in addition to personnel safety).
d) The order of Clauses 5 and 6 have been reversed placing risk assessment and reduction ahead of development of a maintenance program.
e) Requirements for hazard identification and risk assessment (Clauses 5.2 and 5.3) have been expanded and made consistent with other CSA Group standards.
f) Several helpful figures have been added to Clause 6 – program organization, breakdown curves, and age-related failure modes.
g) Clause 7 (General maintenance practices) has been consolidated and reorganized into an order more in line with typical consideration of these practices within a maintenance program.
h) Some of the maintenance advice for special equipment has been integrated into Clause 8 (Equipment-specific maintenance practices).
i) Clause 9 (Specialized equipment maintenance) has been expanded with the addition of maintenance advice for equipment that had not been included in the 2013 edition.
j) Annex C has been completely revised to provide an example approach for risk evaluation and assessment (rather than examples of maintenance practices).
k) Definitions and abbreviations of terms related to electrical maintenance, but not specifically used in this Standard have been added in a new Annex O.

This Standard was prepared by the Technical Committee on Electrical System Maintenance, under the jurisdiction of the Strategic Steering Committee on Occupational Health and Safety, and has been formally approved by the Technical Committee. Because of this Standard's close association with the *Canadian Electrical Code*, it has also been reviewed by the Strategic Steering Committee on Requirements for Electrical Safety (SCORES).

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*

3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

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   b) *provide an explanation of circumstances surrounding the actual field condition; and*
   c) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

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5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to* inquiries@csagroup.org *and include "Proposal for change" in the subject line:*
   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

Z463-18
Maintenance of electrical systems

0 Introduction

Note: *See also Annex A.*

0.1 Purpose and application

This Standard has been developed to improve safety for workers and protection of property through the adoption and systematic application of maintenance strategies for electrical equipment. It specifies basic requirements for maintenance programs and provides guidance on preferred practices for maintenance of electrical equipment.

The maintenance necessary for electrical equipment and systems that are critical to electrical safety for workers can be different than the maintenance required for uptime production or other business objectives. This Standard defines methods of identifying equipment and systems that directly impact worker electrical safety and the reliability necessary for the safe operation of electrical equipment.

Organizations can use this Standard to optimize the integration of other programs and systems, such as hazardous energy lockout control programs and workplace electrical safety programs, into their business management systems for critical equipment maintenance strategies.

This edition of the Standard includes exclusions in Clause 1.3 for particular industries. It is the intention to engage these industries on a go forward basis with the goal of removing the exclusion in whole or in part in future editions.

This Standard is part of the CSA Z460 series, which constitutes a compendium of electrical safety publications. The trilogy consists of

a) CSA Z460, *Control of hazardous energy — Lockout and other methods*;
b) CSA Z462, *Workplace electrical safety*; and
c) CSA Z463, *Maintenance of electrical systems*.

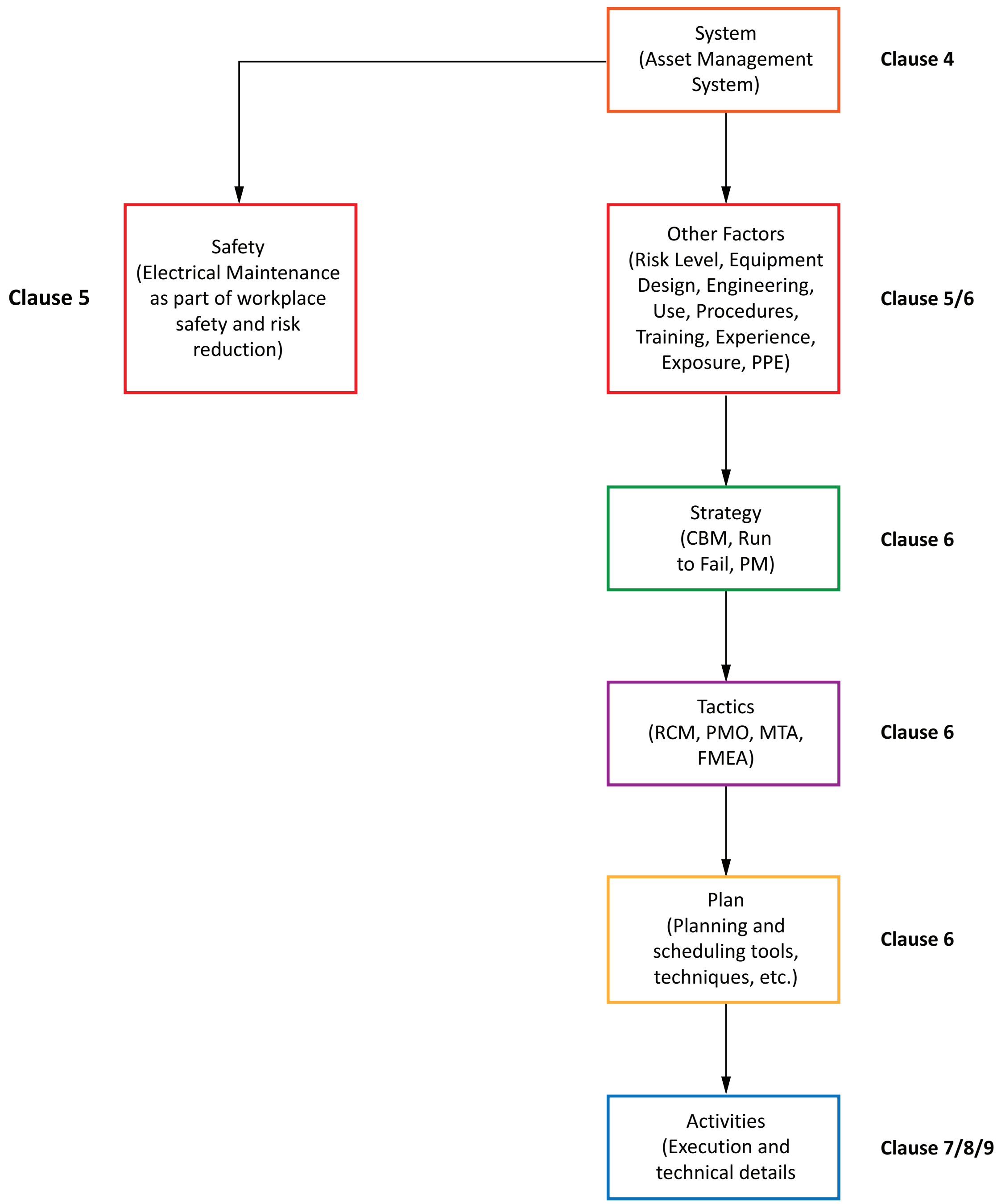
0.2 Organization of this Standard

As depicted in Figure 1, this Standard is organized around the development, establishment, and implementation of an electrical maintenance program (for organizations of all sizes). It begins with electrical maintenance program requirements in Clause 4 for creation of an electrical maintenance program based on the organization’s structure and management system. It then goes on in Clauses 5 and 6 to address the particulars of the program based on needs to protect personnel from harm (safety) and needs for asset management (facilities, equipment, systems). These consist of “strategies” and “plans” as laid out in Clause 6.

Clauses 7, 8, and 9 provide recommended practices – general practice, equipment-specific practices, and special equipment practices. These are all based on the strategy, tactics, and plans selected by the particular organization.

The Annexes provide information and examples that can be used in the understanding and application of the requirements and recommendations in the main body of the Standard. Organizations complying with this Standard may choose whether or not to use this support information.

Figure 1
Guidance on the use of CSA Z463
(See Clause 0.2.)



1 Scope

1.1 General

This Standard specifies requirements for the maintenance of electrical equipment and systems.

This Standard applies to new and existing electrical equipment. For new installations of electrical equipment, this Standard can be applied during the early design stages to allow for the implementation of proactive electrical maintenance practices and maintenance safety.

1.2 Purpose

The purpose of this Standard is to facilitate the safe, reliable, and cost-effective operation of electrical equipment and systems through the application of consistent maintenance practices.

The requirements of this Standard are intended to address worker and public safety as a primary objective and the protection of property and the environment as secondary objectives.

1.3 Application

While it can be applied by organizations of any type or size, at this time this Standard does not cover

a) installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations; and

b) installations under the exclusive control of an electric utility when such installations
   i) consist of service drops or service laterals, and associated metering;
   ii) are located in legally established easements or rights-of-way designated or recognized by public service commissions, utility commissions, or other regulatory agencies having jurisdiction for such installations; or
   iii) are on property owned or leased by the electric utility for communications or for metering, generation, control, transformation, transmission, or distribution of electric energy.

Note: *The term "electrical utility" is defined by the authority having jurisdiction.*

1.4 Measurements

The values given in SI units are the units of record for the purposes of this Standard. The values given in parentheses are for information and comparison only.

1.5 Terminology

In this Standard, "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the Standard; "should" is used to express a recommendation or that which is advised but not required; and "may" is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.