



# IEEE Recommended Practice for Maintenance of DC Overhead Contact Systems for Transit Systems

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**IEEE Vehicular Technology Society**

Sponsored by the  
Rail Transit Vehicle Interface Standards Committee

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# **IEEE Recommended Practice for Maintenance of DC Overhead Contact Systems for Transit Systems**

Sponsor

**IEEE Rail Transit Vehicle Interface Standards Committee**  
of the  
**IEEE Vehicular Technology Society**

Approved 17 June 2009

**IEEE-SA Standards Board**

**Abstract:** This recommended practice provides a set of guidelines that can be used by the operators of new start-up systems seeking guidance in developing manuals, methods, practices, and procedures for the safe and effective maintenance of their Overhead Contact System (OCS), or by the maintenance organizations of existing well-established systems to amplify or refine their existing practices. This recommended practice provides general recommendations for performing maintenance work on dc OCS for transit systems. These recommendations are based on sound engineering principles, engineering safety considerations and field experience by many transit agencies. Included are technical explanations to cover certain testing of tools and equipment; field maintenance and care of tools and equipment; work methods for the maintenance of the OCS; and recommended safety practices and procedures for persons working in the vicinity of energized lines. Since local conditions and circumstances differ from one transit agency to the next, acceptance or rejection of any or all of the recommendations contained therein is left to the discretion of the individual agency, which should determine their applicability to its proposed or existing operating practices and procedures. It is not intended that the guidelines replace present proven transit agency procedures or that the recommended practices form the basis for a mandatory standard.

**Keywords:** auto-tension, backbone, balance weight, cantilever, catenary, contact wire, cross-span, door bridge, electric trolleybus, electrification, ETB, fixed termination, headspan, hi-rail, insulator, jumper, maintenance, messenger wire, OCS, overhead contact system, pantograph, qualified person, section insulator, special work, surge arrester, trolley, trolley pole

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## Introduction

This introduction is not part of IEEE Std 1628-2008, IEEE Recommended Practice for Maintenance of DC Overhead Contact Systems for Transit Systems.

The vast majority of the presently operating electrified rail transit systems use overhead contact systems (OCS) or third rail to supply direct-current (dc) power to the rail vehicles. The OCS Sub-Committee for Rail Transit Systems was formed in 2001 with the purpose of developing standards and guidelines governing the design, construction, and maintenance of OCS for transit systems. One of the primary concerns of the committee, regarding OCS for light rail and electric trolleybus (ETB) systems, was the lack of uniform practices for the maintenance of the OCS, including but not limited to the structural supports, components and hardware, system parameters and operating procedures, and equipment.

The purpose of this recommended practice is to provide a set of guidelines that can be used by the operators of new start-up systems to develop manuals, safety guidelines, practices, and procedures for effective maintenance of their OCS, or by the maintenance organizations of existing well-established systems to amplify or refine their existing practices. It is not intended that these recommended practices form the basis for a mandatory standard. Acceptance or rejection of any or all of the recommendations contained herein is left to the discretion of the individual agency, which should determine their applicability to its proposed or existing operating practices and procedures.

## Acknowledgments

The Overhead Contact System Maintenance Working Group wishes to thank the following individuals who were responsible for the preparation of the figures in this recommended practice.

Figure 1 – Balance weight assembly, Michael N. Lewis, P.E., C.Eng., I.Mech.E (Retired)

Figure 2 – Single contact wire (SCW) OCS, Michael N. Lewis, P.E., C.Eng., I.Mech.E (Retired)

Figure 3 – Simple catenary OCS, Michael N. Lewis, P.E., C.Eng., I.Mech.E (Retired)

Figure 4 – Typical impedance bond arrangement, Philip F. Shepley, Senior Vice President – Transit, Mass. Electric Construction Company

Figure 5 – Method of applying temporary rail jumpers in electrified territory when connections from impedance bond to one or both rails are to be removed or when neutral bond (center tap) is to be opened, Philip F. Shepley, Senior Vice President – Transit, Mass. Electric Construction Company

Figure 6 – Method of applying temporary rail jumpers in electrified territory when rail to which impedance bond is connected is to be removed from track, Philip F. Shepley, Senior Vice President – Transit, Mass. Electric Construction Company

Figure 7 – Method of applying temporary rail jumpers in electrified territory when rail is to be removed from jointed track, Philip F. Shepley, Senior Vice President – Transit, Mass. Electric Construction Company

Figure 8– Method of applying temporary rail jumpers in electrified territory when rail is to be removed from continuous welded rail track, Philip F. Shepley, Senior Vice President – Transit, Mass. Electric Construction Company

Figure 9 – Mobile track ladder, Santiago Muniz, Vice President, STS EL Division, Siemens Transportation Systems, Inc.

Figure 10 – Contact wire twisting tool, Santiago Muniz, Vice President, STS EL Division, Siemens Transportation Systems, Inc.

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## Participants

At the time this recommended practice was submitted to the IEEE-SA Standards Board for approval, the Overhead Contact System Maintenance Working Group had the following membership:

**Michael N. Lewis, *Chair***

**Jeffrey Wharton, *Co-Chair***

Bill Ackehurst  
Michael Acosta  
Peter Bartek  
Craig Berger  
Rosalie Berger  
Michael R. Bertoty  
Alan Blatchford  
Jerome Bochantin  
Gilbert Cabral  
Butch Campbell  
John Ceciliani  
Ron Clark  
Gary Clarner  
Dan Collins  
Larry Davis  
Ray Davis

Ramesh Dhingra  
Binh V. Dinh  
Andrew J. Gillespie  
Fred Greenberg  
Andy Grey  
Richard Hahn  
H. Ian Hayes  
David G. Horne  
Brian Kalvaitis  
Kenneth A. Knight  
Geoff Longworth  
Jim McCarty  
Rodolfo Middelmann  
Matthias Moos  
Alan Murphy  
Bob G. Newton  
Stephen Norton

Thomas F. O'Hara  
Chris Pagni  
Christopher O. Perry  
Frederick J. Perry  
Frederick M. Rooney  
Calvin Shankster  
Philip F. Shepley  
Suresh Shrivastava  
Ash Siddiq  
Jeffrey N. Sisson  
John Smatlak  
Bradley Stone  
Bill Stroup III  
Daren Szekely  
Jerry Woodruff  
Arthur Yuen

The following members of the individual balloting committee voted on this recommended practice. Balloters may have voted for approval, disapproval, or abstention.

Steven Adkins  
Roger Avery  
Ronald Bennell  
Steven Bezner  
Alan Blatchford  
Yunxiang Chen  
Keith Chow  
Robert Fisher  
Paul Forquer  
Fred Greenberg  
Randall Groves  
Lee Herron

Werner Hoelzl  
Paul Jamieson  
Mladen Jeftic  
Andrew Jones  
Walter Keevil  
Tanuj Khandelwal  
Yuri Khersonsky  
Ethan Kim  
Michael Lewis  
Ahmad Mahinfallah  
Michael S. Newman  
Chris Pagni

D. Phelps  
Gilbert Kevin Ratnasingham  
Charles Ross  
Edward Rowe  
Bartien Sayogo  
Alexander Sinyak  
Jeffrey N. Sisson  
James E. Smith  
Ralph Stell  
John Vergis  
Jeffrey Wharton  
Paul White

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**Robert M. Grow**, *Chair*  
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Andy Drozd  
Mark Epstein

Alexander Gelman  
Jim Hughes  
Richard H. Hulett  
Young Kyun Kim  
Joseph L. Koepfinger\*  
John Kulick

David J. Law  
Ted Olsen  
Glenn Parsons  
Ronald C. Petersen  
Narayanan Ramachandran  
Jon Walter Rosdahl  
Sam Sciacca

\*Member Emeritus

Also included are the following nonvoting IEEE-SA Standards Board liaisons:

Howard L. Wolfman, *TAB Representative*  
Michael Janezic, *NIST Representative*  
Satish K. Aggarwal, *NRC Representative*

Lorraine Patsco  
*IEEE Standards Program Manager, Document Development*

Patricia Gerdon  
*IEEE Standards Program Manager, Technical Program Development*

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## 1. Overview

### 1.1 Scope

This recommended practice provides overhead contact system maintenance practices and procedures including maintenance techniques, site inspection and test procedures, and maintenance tolerances, for heavy rail, light rail, and trolley bus systems.

### 1.2 Purpose

There are no known industry-wide guidelines. Guidelines will result in improved reliability and reduced maintenance costs of overhead contact systems for transit.

### 1.3 Application

The OCS Sub-Committee for Rail Transit Systems was formed in 2001 with the purpose of developing standards and guidelines governing the design, construction, and maintenance of overhead contact system