

IEEE Standard for Rail Transit Vehicle Event Recorders

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Abstract: On-board devices/systems, with crashworthy memory, that record data to support accident/incident analysis for rail transit vehicles, are covered. The requirements of this standard are limited to event recorder functions and interfaces. Data transmission methods are excluded. The information in this standard is independent of the hardware and/or software employed for other vehicle systems.

Keywords: crashworthiness, input signal, rail transit vehicle event recorder, rail vehicles, rapid transit, self-test

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

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Secretary, IEEE-SA Standards Board
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
USA

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Introduction

(This introduction is not part of IEEE Std 1482.1-1999, IEEE Standard for Rail Transit Vehicle Event Recorders.)

Event recorders (called flight recorders) have been standard equipment on commercial airliners for many years. Recently, the Federal Railroad Administration (FRA) has required them for specific railroad applications, as described in 49 CFR Part 229 [B1].^a Other modes of public transportation, including rapid rail transit not regulated by the FRA, have recently begun to consider technical requirements for event recorders applicable to those modes. Because there are similarities between the rail modes under FRA jurisdiction and those that are not, a natural starting point for technical requirements is 49 CFR Part 229 [B1].

As subsystems incorporate advanced processing capabilities and are linked together, and as processing capability is added to car and train monitoring and diagnostics systems (MDSs), an increasing number of the signals required by the FRA will become available in a central location. In fact, typical MDS functionality meets and exceeds the formal definition of an event recorder. However, an MDS usually does not meet all requirements and implications of the FRA rule, particularly the physically and electrically secure retention of the most recent 48 hours of operating data.

It is intended that data collected by event recorders meeting this standard be used to help reduce the potential probability of future accidents in cases where equipment design, maintenance practices, training, or procedures can be modified based on such data.

A rail transit event recorder ideally captures signals that could help an accident investigator determine the following:

- The status of the car at the time of, during, and preceding the accident;
- The status of the intelligent systems at the time of, during, and preceding the accident;
- The status of human (crew) controls and indicators at the time of, during, and preceding the accident.

The preceding statuses determine the sources of signals. An example might be brake status:

- a) The actual status of the brakes could be determined by brake pipe pressure, brake cylinder pressure, and brake apply relay status.
- b) The intelligent system output for the brake status could be obtained from a network, car controller, or propulsion and brake controllers.
- c) The crew information could be obtained from the master controller position, and indicator lights or gauges in the cab.

It is not the intent of this standard to preclude the requirements of an event recorder system being satisfied by a combination of on-board and wayside equipment. Neither is it the intent to define the circumstances under which event recorders must be purchased or installed (e.g., new rolling stock, major or minor overhauls, upgrades, or remanufacture of existing rolling stock)—only the requirements to be met are given, if the event recorders are purchased or designed to this standard.

^aThe numbers in brackets correspond to those of the bibliography in Annex A.

Participants

At the time this standard was being drafted, the MDS Event Recorder Working Group had the following participants and/or contributors:

Linda Sue Boehmer, Co-Chair

Sam Basiliou
David Currie
Wayne Galante
Thomas Gardner
Robert Garner
Aaron James
Russ Kology

Chris Holliday, Co-Chair

Pat Murphy
Dak Murthy
Jack Ronalter
Roy Schultise
Ike Tingos
Mike Tuffy
Charles Whelen

Joe Krempasky
Thomas O'Brien
T. Stuart Olson
Vic Maslar
Rob McHugh
Chris Morris

The following members of the balloting committee voted on this standard:

Robert Anderson
Linda Sue Boehmer
Lance G. Cooper
Jim Dietz
Robert J. DiSilvestro
Charles P. Elms
John Ewing
Claude Gabriel
Harold C. Gillen
Yehuda Gross
Robert Heggstad
James R. Hoelscher
Joel Holyoak

Paul E. Jamieson
Kevin D. Johnson
Don Kane
Ronald Kangas
James W. Kemp
William J. Kleppinger
John LaForce
Ron Lawrence
David A. Male
Robert E. McHugh
Kamel Mokhtech
Howard Moody
Edwin A. Mortlock

Patrick Murphy
Robert D. Pascoe
Fred M. Perilstein
William Petit
David R. Phelps
Alan F. Rumsey
David B. Rutherford
Louis Sanders
Gene Sansone
Alexander Sinyak
Thomas J. Sullivan
Arun Virginkar
David Yager

When the IEEE-SA Standards Board approved this standard on 26 June 1999, it had the following membership:

Richard J. Holleman, Chair

Donald N. Heirman, Vice Chair

Judith Gorman, Secretary

Satish K. Aggarwal
Dennis Bodson
Mark D. Bowman
James T. Carlo
Gary R. Engmann
Harold E. Epstein
Jay Forster*
Ruben D. Garzon

James H. Gurney
Lowell G. Johnson
Robert J. Kennelly
E. G. "Al" Kiener
Joseph L. Koepfinger*
L. Bruce McClung
Daleep C. Mohla
Robert F. Munzner

Louis-François Pau
Ronald C. Petersen
Gerald H. Peterson
John B. Posey
Gary S. Robinson
Akio Tojo
Hans E. Weinrich
Donald W. Zipse

**Member Emeritus

Also included is the following nonvoting IEEE-SA Standards Board liaison:

Robert E. Hebner

Yvette Ho Sang
IEEE Standards Project Editor

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