COMPUTERS IN RAILWAYS XI

WIT PRESS

WIT Press publishes leading books in Science and Technology.
Visit our website for the current list of titles.
www.witpress.com

WIT eLibrary

Home of the Transactions of the Wessex Institute.
Papers presented at COMPRAIL 2008 are archived in the WIT elibrary in volume 103 of
WIT Transactions on The Built Environment (ISSN 1743-3509).
The WIT electronic-library provides the international scientific community with
immediate and permanent access to individual papers presented at WIT conferences.
http://library.witpress.com

ELEVENTH INTERNATIONAL CONFERENCE ON
COMPUTER SYSTEM DESIGN AND OPERATION IN THE
RAILWAY AND OTHER TRANSIT SYSTEMS

COMPRAIL XI

Conference Chairmen

J. Allan
Rail Safety and Standards Board, UK

E. Arias
University Castilla La-Mancha, Spain

C.A. Brebbia
Wessex Institute of Technology, UK

C.J. Goodman
University of Birmingham, UK

A.F. Rumsey
Parsons Transportation Group, USA

G. Sciutto
Universita di Genova, Italy

N. Tomii
Railway Technical Research Institute, Japan

International Scientific Advisory Committee

T. Albrecht
W. Daamen
A. Finlayson
I.A. Hansen
M. Jha
J.M. Mera
B. Ning
E. Pilo
F.M. Rachel
A. Radtke
J. Rodriguez
R. Takagi
P. Tzieropoulos
A. Yoshimura

Organised by
Wessex Institute of Technology, UK
University of Castilla – La Mancha, Spain

Sponsored by
WIT Transactions on the Built Environment

WIT Transactions

Transactions Editor

Carlos Brebbia
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton SO40 7AA, UK
Email: carlos@wessex.ac.uk

Editorial Board

COMPUTERS IN RAILWAYS XI

Computer System Design and Operation in the Railway and Other Transit Systems

Editors

J. Allan
Rail Safety and Standards Board, UK

E. Arias
University Castilla La-Mancha, Spain

C.A. Brebbia
Wessex Institute of Technology, UK

C. Goodman
University of Birmingham, UK

A.F. Rumsey
Parsons Transportation Group, USA

G. Sciutto
Universita di Genova, Italy

N. Tomii
Railway Technical Research Institute, Japan

WIT PRESS Southampton, Boston

Published by

WIT Press
Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK
Tel: 44 (0) 238 029 3223; Fax: 44 (0) 238 029 2853
E-Mail: witpress@witpress.com
http://www.witpress.com

For USA, Canada and Mexico

Computational Mechanics Inc
25 Bridge Street, Billerica, MA 01821, USA
Tel: 978 667 5841; Fax: 978 667 7582
E-Mail: infousa@witpress.com
http://www.witpress.com

British Library Cataloguing-in-Publication Data
A Catalogue record for this book is available
from the British Library

ISBN: 978-1-84564-126-9
ISSN: 1746-4498 (print)
ISSN: 1743-3509 (on-line)

The texts of the papers in this volume were set individually by the authors or under their supervision. Only minor corrections to the text may have been carried out by the publisher.

Printed in Great Britain by Athenaeum Press Ltd.

Preface

COMPRAIL 2008, the eleventh in a series of well-established and successful international conferences on Computer System Design and Operation in the Railway and Other Transit Systems, was held in Toledo, Spain, in 2008. Since 1987, COMPRAIL has provided a world forum for planners, designers, manufacturers and operators to discuss how they can benefit from computer-based techniques.

This book contains most of the papers presented at COMPRAIL 2008, representing the latest research, development and application of computers to the management, design, manufacture and operations of railways and other passenger, freight and transit systems.

The Conference attracted a large number of papers, divided into the following sections:

- Planning
- Safety and Security
- Advanced Train Control
- Communications
- Energy Management
- Power Supply
- Operations Quality
- Timetable Planning
- Level Crossings and Obstacle Detection
- Computer Techniques
- Dynamics and Wheel/Rail Interface
- Maintenance
- Rolling Stock
- Training Tools and Technology

This book is distributed throughout the world by WIT Press, the publishing arm of the Wessex Institute of Technology. In addition, together with all other COMPRAIL Conferences held from 1993 onwards, the papers are displayed

in the electronic library of the Transactions of the Wessex Institute (see http://library.witpress.com), permanently available to the international scientific community.

The Editors are grateful to all the authors for the excellent papers and to those members of the International Scientific Advisory Committee who participated in the review process. The success of the conference is the result of their significant contribution of time and energy.

The Editors
Toledo, 2008

Contents

Section 1: Planning

Section 2: Safety and security

Section 3: Advanced train control

Section 5: Energy management

Section 6: Power supply

Section 7: Operations quality

Section 8: Timetable planning

Section 11: Dynamics and wheel/rail interface

Section 12: Maintenance

Section 13: Rolling stock

Section 14: Training tools and technology