IRSE text book synopsis
December 2022
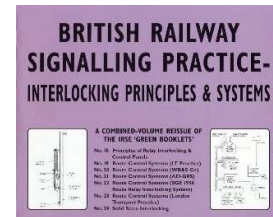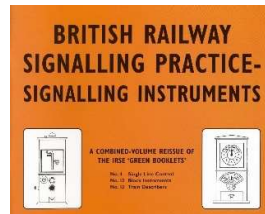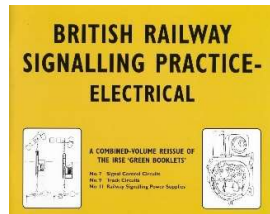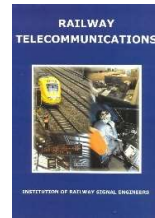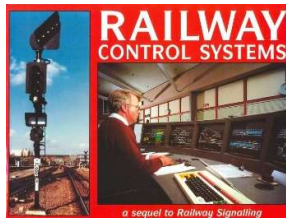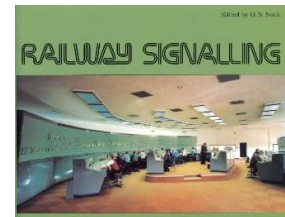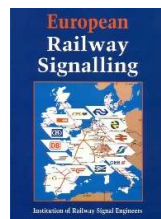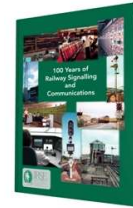
IRSE text book synopsis

The following synopsis have been produced by IRSE's Education and Professional Development Committee and other contributors for IRSE members and non-members to find suitable text books for their study and information within railway control and communications systems.

Contents

![IRSE /// Institution of Railway Signal Engineers]

Metro Train Control Systems

Introduction

The first IRSE book to focus on metro signalling was published in 2003 and subsequent demand by members saw it being reprinted more than once and translated into other languages.

Metros bring their own challenges of moving large numbers of people across cities and form an essential part of the foundations of a city's economy. The rapid pace of technological change, rising to the challenge of providing ever-increasing train service capacity, has led to the production of this completely new book. Vastly expanded and running to nearly 500 pages in full colour throughout, it replaces the earlier work and addresses every aspect of the design and implementation of modern train control systems as applied to the mass transit or metro railways.

This publication aims to give the reader an understanding of metro railways by outlining, comprehensively, the principles and applications of modern metro signalling, transitioning to 'moving block' techniques and bringing the Integrated Train Control System into focus. It takes the reader through all of the design development and implementation activities, bringing out the key aspects of the modern, moving block, metro railway control system. This is an area of rapid development and whilst Communications-Based train Control (CBTC) systems are tailored by suppliers to meet specific solutions required for the metro environment and thus differ from the ERTMS interoperable specifications set by main line operations. Nevertheless, there exist many commonalities that all modern train control or railway engineers will need to consider in their roles.

The book is both a textbook and a reference book — an essential part of the knowledge library for the metro railway engineer.

Contents

The operational requirements of metro railways are extremely demanding, requiring trains to run at close headways while attaining high speeds within the constraints imposed by the relatively short distances between stations. Precision stopping of trains and maximisation of network capacity are also key challenges. The book concentrates on the demands of high-capacity metro systems but also notes that these same technology systems have also been deployed on Light Rapid Transit (LRT) systems.

After outlining the business requirements of metros, it describes their technological evolution up to the publication date. It continues by describing the train control philosophies of such systems and the principles and technologies adopted in such systems, including the various levels of automation through to the Driverless Train Operation (DTO) used on some metro lines and the key challenges that need to be overcome. There is a chapter dedicated to the design development of new metro lines and the use of simulation tools to model and optimise train service capacity. The train control/signalling and communications principles and technologies are brought to life by the technical solutions described by the various major suppliers. A chapter is dedicated to case studies contributed by transport authorities around the world sharing their successes and lessons learnt from using these CBTC systems.

At a time when many suburban railways seek to increase their train services and demand metro-style technical solutions in contrast to those aiming to use a more standardised ERTMS approach, there exists a growing commonality between elements of main line signalling and the metro railway. For this reason, this book will serve also as a useful reference for those in main line signalling development and implementation.

Recommended for

The IRSE recommends this book not only for experienced signal design, project or implementation engineers in metro railways, but also as a valuable reference for those involved with main line suburban applications.

The IRSE recommends this textbook as background reading for those preparing for the IRSE Professional Examination / Advanced Diploma in Railway Control Engineering and background information for the IRSE Certificate in Railway Control Engineering Fundamentals.

In addition, the book will also serve as a good reference for students and others studying for professional qualifications in other, related railway institutions who require a more detailed understanding of metro train control systems and traffic management, particularly people in the Institution of Railway Operators.

Summary	
Title	Metrol Trail Control Systems
ISBN	978-1-3999-1298-3
Available from the Institution of Railway Signal Engineers https://www.irse.org/Store	

Railway Signalling and Control– a sequel to Railway Signalling and Railway Control Systems (the "Yellow textbook")
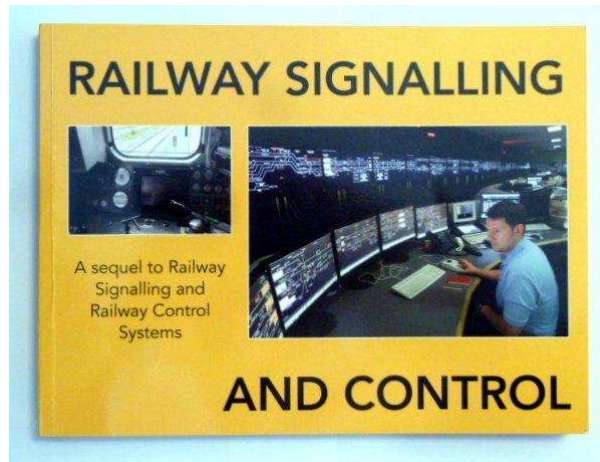
Introduction

A sequel to Railway Signalling (Green Book) and Railway Control Systems (Red Book), this 350 page book provides an essential update to these earlier books and explains more recent developments in signalling technologies and how they are applied, with the focus on UK main-line practice. It also covers entirely new subjects such as ETCS, development in signal sighting, modular signalling technologies, and updates on signalling standards. It explains how the TVM signalling on High Speed 1 has been implemented as well as updating readers in the application of systems engineering techniques.

As control systems have developed recently, the integration of signalling and telecommunications systems has become increasingly the norm. The systems in this book highlight the further integration of railway systems such that the divide between trackside and on-board systems is rapidly disappearing.

Contents

The range of subjects covered is substantial. An introductory section covers developments in signalling since the Red book - including discussion on signalling's role in railway system risk management, and the evolution of standards and their application during this period of rapid change (1990-2014) due to privatisation, the increasing influence of European Standards, accidents, increasing emphasis on reliability and availability.

Subsequent chapters cover the importance of the signalling and telecoms technologies within a wider Systems Engineering approach to rail enhancement and management. Control Systems technologies are covered in detail as are recent developments in Interlocking principles, safety, architectures and requirements. This overview of interlocking developments is then supported by a detailed survey of recent interlocking types from different suppliers including SSI, SIMIS-W, ACC, VLC, Smartlock Westlock and Westrace.

The volume covers developments in train detection, point operation, level crossing protection, and UK- specific Train Protection, Warning and Control systems (AWS, TPWS, TASS) as well as European systems (ETCS and TVM). Finally, there are chapters covering developments in Modular signalling and in the art and science of Signal Sighting.

A thread that runs through the book is in ongoing integration of such technologies within the wider railway systems environment and the progression from lineside based conventional systems to the new norm of train-borne technologies akin to those commonplace in Metros.

Recommended for

The book is intended to be of value to railway operators, consultants, designers, engineers and technicians, within interest in train control systems largely as applied in the UK and it will be of use to those studying in countries who follow UK practice or wish to learn more about some of the interlocking technologies available around the world.

The IRSE recommends this textbook as background reading for those preparing for the IRSE Professional Examination / Advanced Diploma in Railway Control Engineering, and, particularly for Exam modules B, C and D.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of train-borne signalling, traffic management and control, particularly those in the Institution of Railway Operators.

Please see also

- IRSE "Green Textbook" Railway Signalling page 11
- IRSE "Red Textbook" Railway Control Systems page 13

Summary	
Title	Railway Signalling and Control
ISBN	978-0-902390-294
Available from the Institution of Railway Signal Engineers https://www.irse.org/Store	

100 Years of Railway Signalling & Communications
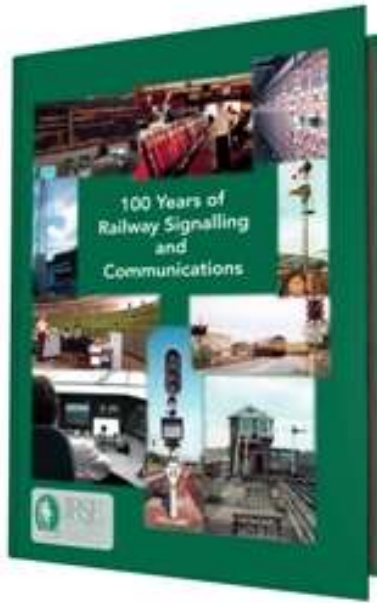
Introduction

Written to mark the IRSE's Centenary in 2012, this 450-page book records the continuing evolution of signalling and communications technology since 1962, when the Institution's Golden Jubilee was marked by the publication of O S Nock's 'Fifty Years of Railway Signalling'. In addition to the Technology, this book presents a comprehensive history of the IRSE from initial formation of the 'Institution of Signal Engineers' in 1910 to the formal incorporation of the new Institution in 1912, and its subsequent development and expansion into an organisation with global horizons and world-wide membership. As a background to the history, which includes the formation of Local Sections, of which (in 2017) there are 15 in operation around the world, the book explains the structure, governance and operation of the IRSE, its events, awards, training and accreditation of competence, and particularly its contribution to the development of safety management in support of signalling and communications technology and application.

In the fifty years since 1962, railway signalling and communications, once seen as distinct, albeit complementary, disciplines have become ever more convergent, encouraged by the exponential development of programmable electronics, miniaturisation and Information Technology. Most significantly, the march of electronics and communication has brought within reach of the signal engineer long-sought after solutions to hazards posed by 'human error' such as trains being driven at excessive speeds and drivers failing to observe lineside signals, by extending the controls applied by the signalling system into the train itself, to provide not only automatic train protection but also the ability to allow trains to operate without human intervention.

Contents

This book provides an unparalleled record of the history and development of signalling and communications over the first hundred years of the IRSE's existence. It provides not only a record of technological development, but tells the stories of the people who drove and

guided that development. It also provides case studies of practice in different countries and of current developments such as communications-based train control.

Recommended for

Those seeking to understand the history of the IRSE and of the general development of signalling and telecommunications from the early 19th Century until 2012.

This book would be particularly useful to people contemplating a career change from an unrelated industry into railway signalling and communications who seek to understand the value that the IRSE brings to the Profession and the contexts in which signalling and communications have developed.

Those seeking access to sources of further information will find a whole chapter devoted to the arrangements for knowledge sharing by the IRSE, with references also to technical publications and further reading which will be of particular interest to those contemplating a career in the Profession.

This history may also be of interest to students and others studying for Professional qualifications in other, related Railway Institutions particularly those in the Institution of Railway Operators.

Summary	
Title	100 Years of Railway Signalling & Communications
ISBN	978-0-902390-27-0
Available from the Institution of Railway Signal Engineers https://www.irse.org/Store	

European Railway Signalling
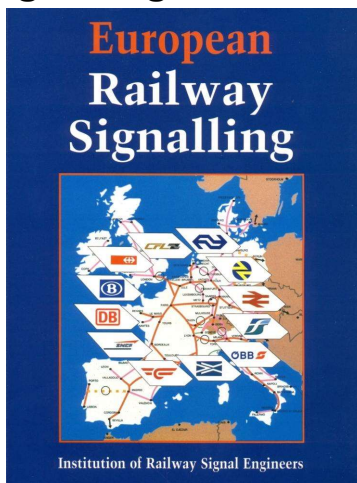
Introduction

In 1995, at the instigation of a former French President of the Institution, Jacques Catrain, the Institution published a text book called European Railway Signalling, which described the then current signalling practice of twelve European railway administrations, at that time largely integrated railway infrastructure and operations companies. This was particularly relevant with the opening a year earlier of the Channel Tunnel between England and France and at a time when discussions were already underway on the development of an interoperable and standard signalling system for the whole of Europe, a dream still in the process of being fulfilled.

Contents

This book covers the systems of 12 European countries: Austria, Belgium, France, Germany, Great Britain, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden and Switzerland. The first chapter is devoted to railway signalling principles as applied by each country. Later chapters consider the development and application of signal engineering components and systems, together with historical references as appropriate. Subjects include practice in the cab, in the control room and trackside, train detection, level crossings and the use of radio. Finally, the future of railway signalling is discussed.

Despite the publication date of the mid 1990's there remains much useful information, particularly for those wishing to compare and understand how the essential elements of a signalling system for main lines (transit and metros are excluded) are implemented in differing ways across Europe. The IRSE has subsequently reached agreement with the Railway Electrical Engineering Association of Japan with to translate the book into Japanese for the benefit of their members in Japan who wanted to find out more about signalling in Europe. As a result this textbook is now available from them in Japanese.

Recommended for

Those wishing to understand the differing approaches to railway signalling control and communications across Europe. Those involved in the development of Rail Traffic Management Systems or wishing to understand the divergence of signalling practice which ERTMS is designed to overcome will find much of interest.

It will be of particular use to students in preparation for the IRSE examination from a European perspective.

It may also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of the subject and seeking comparisons of differing practices.

Please see also

- ETCS for Engineers
- Compendium on ETCS

Summary	
Title	European Railway Signalling
ISBN	978-0-902390-25-6
Available from the Institution of Railway Signal Engineers https://www.irse.org/Store	

Railway Signalling – a treatise on the practice of British Railways (the "Green textbook")
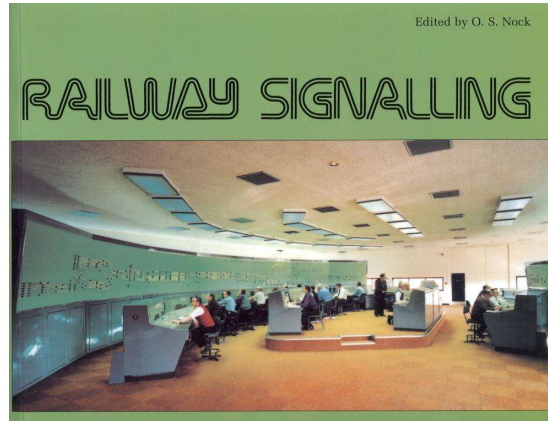
Introduction

Railway Signalling', the first of what has become a sequence of IRSE textbooks dealing with railway signalling and telecommunications developments, was first published in 1980 and covers the period of development of the then standard British Railways system of Multiple Aspect Signalling (MAS) through the 1960s and 1970s. It is comprehensively illustrated, with line diagrams and schematics throughout the book. The book is largely focussed on British Mainline signalling practices but will also be of use to those elsewhere in which signalling concepts are different who may like to make comparisons with British practices.

Contents

Popularly known as the 'Green Textbook', this volume starts with a statement of the philosophy of railway signalling as adopted in Britain and proceeds to a detailed discussion of the fundamental principles of signalling and their application to a number of layouts and situations, supported by calculation and illustrated by layout schematics depicting the features of 2-, 3- and 4-aspect colour light signalling, placement of signals, and calculation of train headways. The chapter includes worked examples of determining signal spacings to optimise line capacity, and explains the reasoning underlying the basic elements of a signalling scheme.

Following the explanation of principles guiding the layout of signal, the book explains the principles of interlocking, as applied to a MAS signalling scheme. Further chapters then explain the design and operation of basic signalling hardware including lineside colour-light signals, point machines and the 'BR 930' range of safety signalling relays, and the design, construction and wiring of modular or 'mosaic' control panels. A separate chapter covers the principles of both DC and AC track circuit operation and explains their application. As it formed the basis of the expansion of resignalling schemes to ever larger control areas through the later 1960s and 1970s, the concepts and operation of the two principal systems of 'Geographical' or 'packaged' relay interlocking are described in detail and illustrated by circuit diagrams.

Later chapters describe contemporary applications of electronics to railway signalling system, for multiplex remote control systems to allow operation and supervision of interlockings located at a distance from the control centre by avoiding the need for individual

circuits and conductors for each function, and for Train Describers, a necessary adjunct to a signalling system that can control train movements over areas covering hundreds of track miles where dozens of train movements may be in progress at any time. The final chapter explains the operation of British Railways' Automatic Warning System, a simple but significant aid to train drivers needing to observe lineside signals at high speed and occasionally poor visibility.

Recommended for

Although this textbook was originally published in 1980 the IRSE still recommends as an invaluable introduction to the basic philosophy, principles and equipment of the railway signalling systems in use in the UK towards the end of the British Railways era.

It is recommended background reading for those preparing for the IRSE Professional Examination / Advanced Diploma in Railway Control Engineering, particularly module C, and will also be of use to those working today on BR-era equipment or on railways which follow British practices.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of signalling principles, interlockings and other equipment; and of the relationship between headways, speed, capacity and signalling.

Please see also

- IRSE "Red Textbook" Railway Control Systems page 13
- IRSE "Yellow Textbook" Railway Signalling and Control page 3

Summary	
Title	Railway Signalling
ISBN	978-0-7136-2724-4
Available from the Institution of Railway Signal Engineers https://www.irse.org/Store	

Railway Control Systems – a sequel to Railway Signalling (the "Red textbook")
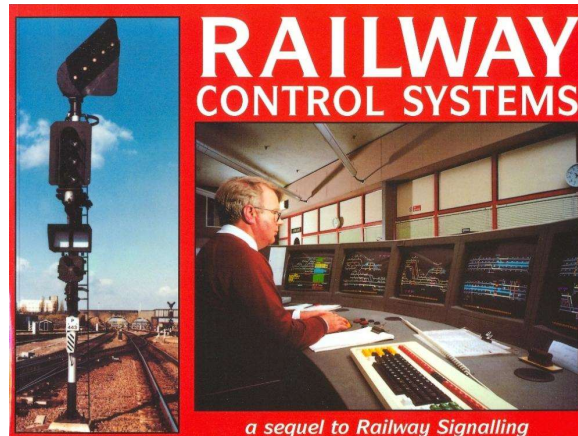
Introduction

'Railway Control Systems – a sequel to Railway Signalling' was the second such book to be published by the IRSE and appeared in 1991. The 1980s were a significant decade in the history of railway signalling in Britain, with the UK's first electronic interlocking, SSI, making its debut in 1985, soon to be followed by another microprocessor-based development, the Integrated Electronic Control Centre or IECC. Both these developments are described and illustrated in extensive detail in this volume, popularly known as the 'Red Textbook'.

Contents

In addition to describing these advances in technology, this book adds to and complements the material presented in the previous textbook. Changes in signalling philosophy since the publication of the Green Textbook are described, together with advances in train detection, particularly the development of jointless track circuits and the introduction into the signalling mainstream of axle counters as an acceptable alternative to track circuits. Chapter 7 in particular elaborates upon the descriptions of signalling hardware in the earlier textbook, describing in greater detail a number of specialised signalling relay designs as well as developments in the areas of lineside signals and point operation.

This book also introduces three fundamental signalling topics not previously covered: the theory and practice of signalling system immunisation, the operation of single lines by a variety of different block systems, and Level Crossings. The last-named in particular describes, with full circuit descriptions and diagrams, the operation of every type of active level crossing protection then in use on the British railway network. The final two chapters introduce concepts which up until the 1980s had not been widely implemented on main line railways in the UK, namely 'active information systems' using data from the signalling system to provide real time information to passengers, and Automatic Train Protection, the absence of which was beginning to attract much public attention and concern.

This book provides an invaluable companion to the 1980 Green Textbook, with which it provides a comprehensive record of British railway signalling at the end of the twentieth century.

Recommended for

The IRSE recommends this textbook as background reading for those preparing for the IRSE Professional Examination / Advanced Diploma in Railway Control Engineering module C and will also be of use to those working today on later BR-era equipment or on railways which follow British practices.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of more recent signalling systems, more recent developments and in particular of level crossing controls single line signalling at train protection.
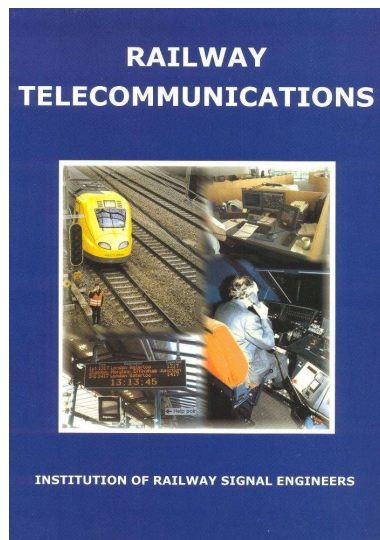
Please see also

- IRSE "Green Textbook" Railway Signalling page 11
- IRSE "Yellow Textbook" Railway Signalling and Control page 3

Summary	
Title	Railway Control Systems
ISBN	0-902390-16-3
Available from the Institution of Railway Signal Engineers https://www.irse.org/store	

Railway Telecommunications

Introduction

'Railway Telecommunications' was published in 2004. It is the only book written on the subject of Railway Telecommunications by the IRSE. This book was developed to provide the reader with a practical viewpoint of Railway Telecommunications. The book similar to others published by the IRSE, takes a down-to-earth and trackside approach to the subject. It endeavours to guide and inform engineers, both new and experienced, to the railway telecommunications industry. It has been written taking a worldwide audience in mind. Although the majority of the book's examples are UK specific, the book attempts to provide the underlying IRSE design principles that can be applied worldwide.

Contents

This book begins with two chapters of general background on Railway Telecommunications, which explain the need for and justification of railway telecommunications, its practical role in the railway and the ways in which railway telecommunications underpins the safe running of trains.

Each chapter is written as a self-contained module on the various elements to the UK Railway deployment of telecoms assets and are written in such a way that the reader will not be required to refer to printed information elsewhere in the book or other texts. This provides the reader with a very limited amount of repetition between chapters.

Following the engineering chapters, the book goes on to discuss constraints that engineering solutions to specific operational hazards engineers may come across on the UK rail infrastructure on a daily basis.

The final three chapters cover the wider issues that both engineers and managers might need to consider, for example; competence management, commercial opportunities and the future vision of railway telecommunications. This is section should now be considered as a good reference guide to future advancements, due to the age of the book.

The final chapter is the reference section to the book, where the reader is provided with a glossary and suggested relevant standards. Due to the age of the text, it would be advisable to use these standards as a reference only and search for the relevant standards individually. There are also definitions of technical terms and explanations of the acronyms used throughout the book.

It is important to note that this book is based on technology in 2004, but 90% of this is still used today on the UK railway. Therefore, the reader may need to seek further advice based on the future technology detailed within the book.

Recommended for

Although this textbook was originally published in 2004 the IRSE still recommends it as an invaluable introduction to the basic philosophy, principles and equipment used within railway telecommunication systems.

It is recommended background reading for those preparing for the IRSE Professional Examination / Advanced Diploma in Railway Control Engineering, modules C & D, and will also be of use to those working today on railways which follow British practices.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of telecoms principles, cabling, transmission, CCTV and other Operational Communications & SISS equipment.

Summary	
Title	Railway Telecommunications
ISBN	0-902390-17-1
Available from the Institution of Railway Signal Engineers https://www.irse.org/store	

![IRSE /// Institution of Railway Signal Engineers]

British Railway Signalling Practice Combined volume re-prints of IRSE Green Booklets

Introduction

Not to be confused with the IRSE "Green Book" (Railway Signalling), the IRSE Green Booklets are a series of reprints of older technical publications on various detailed aspects of signalling technologies of the mid-20th Century (and in some cases older systems) and which are increasingly being displaced on today's railway. These publications date variously from 1951 to 1988 However in many cases such systems continue to give good service and will do for some time yet on secondary routes. Many of the principles contained here continue to apply, even though they may be implemented with newer technologies. Heritage railway operations still rely on such systems and indeed they are often a feature of the operation.

Contents

The individual booklets are combined into volumes as shown in the table below, with titles which are largely self-explanatory.

British Railway Signalling Practice – Mechanical
No 1 Principles of the Layout of Signals
No 2 Principles of Interlocking
No 3 Mechanical & Electrical Interlocking
No 10 Mechanical Signalling Equipment
British Railway Signalling Practice – Electrical

No 7 Signal Control Circuits
No 9 Track Circuits
No 11 Railway Signalling Power Supplies
British Railway Signalling Practice - Signalling Instruments
No 4 Single Line Control
No 12 Block Instruments
No 13 Train Describers
British Railway Signalling Practice - Signalling Relays and Circuits
No 5 Power Points
No 6 Signalling Relays
No 8 Typical Selection Circuits
No 17 Signalling for AC Electrified Areas
British Railway Signalling Practice – Multiple Aspect Signalling
No 14 Multiple Aspect Signalling
No 15 Circuits for Colour Light Signalling
No 16 Route Holding
No 27 Signalling the Layout (British Practice)
British Railway Signalling Practice – Interlocking Principles & Systems
No 18 Principles of Relay Interlocking & Control Panels
No 19 Route Control Systems (LT practice)
No 20 Route Control Systems (WB&S Co)
No 21 Route Control Systems (AEI-GRS))
No 22 Route Control Systems (SGE 1958 Route Relay Interlocking System)
No 28 Route Control Systems (LT Practice) [updated & revised edition of No 19]
No 29 Solid State Interlocking
British Railway Signalling Practice – AWS, Level Crossings & Remote Control Systems
No 24 Automatic Warning Systems of Train Control and Train-stops
No 25 Level Crossing Protection
No 26 Remote Control of Railway Signal Interlocking Equipment

Recommended for

These combined volumes will be of most use to designers, engineers and technicians working on older signalling systems and in particular those involved in their modification, maintenance and repair. In particular those working on Heritage railways will find much of interest.

The IRSE recommends these booklets as useful historic general background reading for those preparing for the IRSE Professional Examination / Certificate in Railway Control Engineering Fundamentals and Advanced Diploma in Railway Control Engineering.

They will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of older systems and some of the volumes may be of interest to Operations professionals and Members of the Institution of Railway Operators.

Summary	
Titles	British Railway Signalling Practice – Mechanical British Railway Signalling Practice – Electrical British Railway Signalling Practice - Signalling Instruments British Railway Signalling Practice - Signalling Relays and Circuits British Railway Signalling Practice – Multiple Aspect Signalling British Railway Signalling Practice – Interlocking Principles & Systems British Railway Signalling Practice – AWS, Level Crossings & Remote Control Systems
Available from the Institution of Railway Signal Engineers https://www.irse.org/store	

Metro Railway Signalling – Out of print – superceded by Metro Train Control Systems
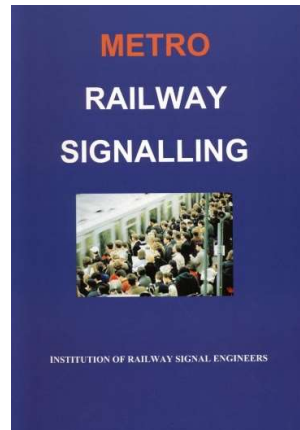
Introduction

First published in 2003, this IRSE book provides an overview of the requirements focussed on metro and mass transit signalling and train control systems. It is a companion volume to the IRSE Green, Red and Yellow textbooks.

This publication aims to give the reader an understanding of metro railways by outlining, in detail, the principles and applications of signalling. It covers both older systems many of which are still in use and recent (2003) developments. This is an area of rapid development and readers using this textbook are also advised to consult more recent sources.

This Institution textbook has also been translated from English into Korean in 2008.

Contents

The operational requirements of metro railways are very demanding, requiring trains to run at close headways while attaining high speeds s possible within the constraints imposed by the relatively short distances between stations. Precision stopping of trains and maximisation of network capacity are also key challenges. The book concentrates on heavy metro systems but also makes reference to Light Rapid Transit (LRT) systems.

After outlining the business requirements of metros it described the technological evolution up to the publication date. It continues by describing the signalling philosophies of such systems and the principles and technologies adopted in such systems including Automatic Train Operation (ATO) Automatic Train Protection (ATP). The principles of several different technologies are described. There is a useful chapter on scheme design and implementation for metro signalling systems mapped onto a V lifecycle and although written around metros, this chapter will also be of use to those involved in main-line applications. Proprietary systems are described as at date of publication and the book concludes with illustrations of case studies around the world.

Recommended for

The IRSE recommends the Metro Train Control Systems book (page 3 – published in 2022) as an up-to-date reference book with case studies of metro and rapid transit signalling, traffic management and control.

The IRSE recommends this textbook as background reading for those preparing for the IRSE Professional Examination / Certificate in Railway Control Engineering Fundamentals and Advanced Diploma in Railway Control Engineering, and will also be of use to those working today on Metros.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of metro signalling, traffic management and control, particularly those in the Institution of Railway Operators.

Please see also

- IRSE Metro Train Control Systems page 3
- IRSE "Green Textbook" Railway Signalling page 11
- IRSE "Red Textbook" Railway Control Systems page 13
- IRSE "Yellow Textbook" Railway Signalling and Control page 3

Summary	
Title	Metro Railway Signalling
ISBN	978-0-902390-26-3

Railway Operation and Control by Joern Pachi

Introduction

This book provides, in a compact form, the very basic knowledge in the science of railway operation and its relationship to signalling principles and traffic control technologies. It was written both as a tutorial for students of railway-related programs and as a reference for people in the industry.

Contents

Although written from a European point of view, this book takes an independent look at railway operation without concentrating on the operating philosophy of any particular national railway. However, some contrasts and comparisons are made between operating procedures and signalling principles where these aid understanding. US, British and German practice are the most common comparators used.

After an introductory chapter on basic terms and definitions, the second chapter provides some background on train movement dynamics. The following chapters on train separation and interlocking principles form the main part of the book with extensive coverage of different forms of signalling control and their relationship with network capacity, headways, regulation and traffic management Other chapters cover capacity research (in some detail), scheduling, and traffic management.

For the 3rd edition, the content was thoroughly revised considering current developments in railway signalling and control technologies. In particular, the section on the European Train Control System (ETCS) was updated by the latest developments. There is now also a new section on the North American Positive Train Control (PTC) comparing it with the European approach.

The information presented in this book is not intended to supersede or negate any rules, regulations, or instructions of government bodies or railway companies. Further, it is not intended to conflict with any currently effective manufacturers operating, application, or maintenance instructions and/or specifications; nor indeed with materials published by the IRSE.

Recommended for

Signal engineers working on the early stages of scheme design development and those involved in traffic management and regulation systems will find this volume of particular use. Those working in operational planning or working with signal engineers on new projects will also find detailed information to enhance their understanding.

The IRSE suggest that this textbook as background reading for those preparing for the IRSE Professional Examination / Advanced Diploma in Railway Control Engineering particularly for Module D

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions and particularly those in the Institution of Railway Operators.

Please see also

- Railway Timetable & Operations Analysis, Modelling, Optimisation, Simulation, Performance Evaluation page 28

Summary	
Title	Railway Operation and Control
ISBN	978-0971991514
Available from Amazon	

Railway Signalling and Automation

Introduction

Signalisation et automatismes ferroviaires / Railway Signalling and Automation

Described as "The bible of European railway signalling and automation as a book in three volumes". This bilingual (French and English) book, explores signalling and automation for main lines and urban transport (metros and tramways). Eleven specialists in rail operation and construction as well as in academia produced the book in three volumes. Intended originally for students on the French Railway and Urban Transport Systems master's degree course, it is clearly of great value to other rail professionals as well. The authors are expert engineers from French rail networks (SNCF and RATP), the signalling industry (Alstom, Ansaldo-STS, Siemens) and the Université de Technologie de Compiègne (UTC).

Contents

The book comprises three Parts, each of which has its own particular focus.

Part I looks at the general aspects of railway signalling and automation within their environment.

Part II describes the main functions.

Part III deals with practical example applications, showing how different systems actually operate.

Published in three volumes, the first volume encompasses Part I and the beginning of Part II, the second volume concludes Part II and the third volume comprises Part III.

Part I focuses on the environment of railway signalling: railway 'philosophy' of operating and maintenance rules, track points and crossings, electrification systems and rolling stocks, as well as different types of detectors.

Part II provides detailed descriptions of the main function of railway signalling: train detection and location, signalling from the perspective of the driver, passenger protection, route control and spacing of trains, level crossings, cab signalling and speed control, centralised traffic control, signalling technologies, and the design, testing and maintenance of signalling installations.

Part III deals with practical applications showing how different products (track circuits, axle counters, point machines, signals etc.) and systems (control centres, speed control systems, automated systems etc.) actually operate. Two chapters of this Part are devoted to ERTMS and CBTC systems.

Recommended for

Whilst being intended for experienced railway signalling experts and operators, and particularly those wishing to expand their knowledge outside their native area, these volumes may also provide help and assistance to students wanting to extend their knowledge to an international level of understanding and thinking. It may also be of use to students and others studying for Professional qualifications in other, related Railway

Institutions who want a more detailed understanding of the subject and seeking comparisons of differing practices.

Please see also

- IRSE ETCS for Engineers
- Compendium on ETCS page 30

Summary	
Title	Compendium on ERTMS
ISBN	B002NQU5UO

Available from : La Vie du Rail Victoria Irizar, Directrice Commerciale, 11, rue de Milan, 75009 Paris, France Tél. : +33 1 49 70 12 48 Fax : +33 1 49 70 12 13 Email: victoria.irizar@laviedurail.com Contact Victoria for postage costs.
Also available at the same price from Amazon France, www.amazon.fr

Railway Signalling & Interlocking International Compendium

Introduction

Railway Signalling & Interlocking International Compendium is published by DW Media Group / Eurailpress rather than the IRSE. Railway signalling has always previously been a nationally applied technical field, however, with the event of globalisation, the future success of interoperability and better working relationships between manufactures, suppliers and maintainers depends on the sharing and understanding of knowledge. The purpose of this book has been stated as providing a generic approach in the summary and comparison of railway signalling and interlocking methods at an international level. More than 20 authors from universities and practitioners from various countries have contributed, and much literature has been used to gain the information.

Contents

The book sets out the basic signalling and interlocking principles, breaking down and comparing all items and issues at an understandable level, regarding the applied solutions in the different countries. The book is broken down into 14 chapters, with numerous sub-chapters below that in order to provide the robust detail and information regarding each subject matter.

The main chapters cover the basic characteristics of Railway Systems, the Requirements for Signalling Safety, Reliability in Signalling Systems, Railway Operation Processes, Interlocking Principles, Detection, Moveable Track Elements, Signals, Train Protection systems, Interlockings, Systems Remote Control and Operation, Technology Safety and Control of Marshalling Yards, Level Crossings, Hazard Alert Systems and systems for Centralised Operational Control. The extent of the detail regarding the differing equipment types, operating practices and processes between countries is clearly identified. There is particularly detailed content on Detection, Moveable Track Elements and Level Crossing. However, there is only a small reference regarding railway telecommunications and nothing regarding their importance when operating the railway in a degraded mode of operation.

With an extensive listing of references, a detailed glossary is provided and these will provide sources for further reading and study.

Recommended for

Whilst being intended for experienced railway signalling experts and operators, the editors and authors recognise the help and assistance it can also provide to students wanting to extend their knowledge to an international level of understanding and thinking. The IRSE therefore suggest that this textbook as background reading for those preparing for the IRSE Professional Examination / Certificate in Railway Control Engineering Fundamentals and Advanced Diploma in Railway Control Engineering.

It may also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of the subject and seeking comparisons of differing practices.

Summary	
Title	Railway Signalling & Interlocking International Compendium
ISBN	978-3962451561
Available from Amazon	

Railway Timetable & Operations Analysis, Modelling, Optimisation, Simulation, Performance Evaluation

Introduction

The performance of many railway networks and the quality of services offered is becoming more and more critical. The main issues are the increasing traffic volumes, making the best use of the available capacity and resolving the priorities for its use. Signal and Telecommunications Engineers have a key role to play in meeting these challenges.

The key to achieving higher efficiency and quality is an awareness of the impact of availability, reliability and robustness of the hardware subsystems on train processes. This is especially important at system pinch points and during service disruptions. A deeper insight into the probability of failures and the causes of deviations from the timetables depends on a thorough analysis of real world railway operations, together with feedback for optimising the timetable and improving railway traffic management. This can be achieved by a closer collaboration of planners, engineers and researchers from the various scientific disciplines with the professional railway operators.

Contents

This book describes current state-of-the-art methods of railway timetabling, operations analysis and modelling, simulation, and traffic management. The intention is to stimulate their broader application in practice and to identify areas where further research is needed

This compendium of 12 chapters contributed by members of the International Association of Railway Operations Research, looks at timetable design, traffic modelling and analysis, with examples of calculation and practical applications. The early chapters consider the theory of timetable design and infrastructure modelling, whilst later sections look at issues such as energy efficiency, stability analysis, dealing with disruption and performance evaluation.

The book discusses and explains the relationship between timetabling and traffic management as two essential elements of public transport operations, which are inherently linked, but where a gap remains between the theory of timetable compilation and the operation of services on a daily basis.

Recommended for

The book is directed primarily at academics, Masters and PhD students and professionals from the railway industry, but also public authorities that tender and monitor railway service provision.

Signal engineers working on the early stages of scheme design development and those involved in traffic management and regulation systems will find this volume of particular use. Those working in operational planning or working with signal engineers on new projects will also find detailed information to enhance their understanding.

The IRSE suggest that this textbook is background reading for those preparing for the IRSE Professional Examination / Certificate in Railway Control Engineering Fundamentals and Advanced Diploma in Railway Control Engineering generally, but especially module C.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions and particularly those in the Institution of Railway Operators.

Please see also

- Railway Operation and Control by Joern Pachi page 22

Summary	
Title	Railway Timetable & Operations Analysis, Modelling, Optimisation, Simulation, Performance Evaluation'
ISBN	978-3777104621
Available from Amazon	

Compendium on ERTMS: European Rail Traffic Management System

Introduction

ERTMS development started in 1989 in the context of plans for a European high-speed railway network. This standard work gives an introduction to ERTMS and an overview of the current status, including the consolidation which will follow the formal adoption of new baselines for the ETCS and GSM-R specifications.

Compiled by the UIC, this compendium also marks the 20th anniversary (2009) of the start of work to develop a common European signalling and train control system. This compendium offers a complete guide to the complex ERTMS concept, giving an overview on all relevant sub-projects.

Contents

This compendium is intended to provide a comprehensive introduction to the complex ERTMS concepts by providing an overview of the various sub-projects. After an introduction to the principles of train control, the chapters look at traffic management, signalling, the elements of ETCS and GSM-R, the current state of implementation and the increasing adoption of ETCS outside Europe. The final sections look at the potential benefits and the longer-term perspectives for a global standard train control system.

The focus is very much on the business drivers and benefits underlying ETCS, its place as one enabler of European Rail Interoperability, pre-cursor projects to ERTMS, yet it provides a comprehensive system description of ETCS, the requirements for the GSM-R system of telecommunications and illustrates early implementation pilot projects in 13 countries.

Recommended for

The volume is less technically-focussed than its companion volume 'ETCS for Engineers' written by the IRSE and may provide a less challenging introduction to the subject for those with little or no prior knowledge.

Its aim is to assist the work of all parties and people engaged in the wider roll-out of ERTMS for the benefit of safe, efficient and sustainable rail transport.

It will be of use to students studying for the IRSE Professional Examination / Advanced Diploma in Railway Control Engineering, particularly Modules B and C.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions and particularly those in the Institution of Railway Operators.

Please see also

- IRSE ETCS for Engineers
- IRSE "Yellow Textbook" Railway Signalling and Control page 3

Managing Railway Operations and Maintenance – Best Practices from KCRC (Hong Kong)

Introduction

As an active participant in the Nova benchmarking initiative for urban rail operators since 1998, Hong Kong's Kowloon-Canton Railway Corp earned a high reputation among fellow operators. Published in the 97th and last year of the Kowloon – Canton Railway (before it was merged into Hong Kong's MTRC), "Managing Railway Operations and Maintenance: Best Practices from KCRC" provides detailed descriptions of railway best practice as developed by KCRC, including its superior asset management, driven by the "prudent commercial principles" under which the Hong Kong railways operate, the principle of continuous improvement that is a feature of most East Asian railways, and proper condition monitoring and the willingness of their government to let them price their services at or near to market rates.

Contents

This volume was planned partly as a textbook for the MSc course in Railway Systems Engineering at the University of Birmingham, as the first of a series sharing best practice between rail operators. It comprises a series of 37 Papers by leading consultants, engineers and academics cover marketing and customer service, operations and engineering management, risk management and safety, learning and growth, and financing; supported by illustrations, diagrams and case studies.

Of particular interest to signalling and telecoms engineers are chapters dealing with service quality, punctuality and performance, infrastructure maintenance, signalling and Automatic Train Operation, Communications Based Train Control, electromagnetic compatibility, platform edge safety and platform screen doors, risk management and safety, human factor design for Control centres.

Recommended for

The book is intended to be of value to railway operators, consultants, engineers and technicians, as well as to students looking to enter the railway industry. It is written for the non-specialist, but also contains valuable insights for experts who have not been exposed to the extreme demands- in any engineering discipline- placed on railways in Hong Kong.

The IRSE recommends this textbook as background reading for those preparing for the IRSE Professional Examination / Certificate in Railway Control Engineering Fundamentals and Advanced Diploma in Railway Control Engineering, particularly for Exam module B, and will also be of use to those working today on Metros.

It will also be of use to students and others studying for Professional qualifications in other, related Railway Institutions who want a more detailed understanding of metro signalling, traffic management and control, particularly those in the Institution of Railway Operators.

Summary	
Title	Managing Railway Operations and Maintenance – Best Practices from KCRC (Hong Kong)
ISBN	978-0952999720
Available from Amazon	