



American Railway Engineering and
Maintenance-of-Way Association

CHAPTER 17

HIGH SPEED RAIL SYSTEMS¹

FOREWORD

This Chapter contains AREMA recommended practice with respect to the planning, engineering, construction and maintenance of commuter, passenger and high-speed rail systems. It also includes recommendations relative to an incremental approach such as the upgrading of existing facilities for increased speeds, recognizing the possible joint use by freight and passenger services. These joint usage issues should be addressed at the preliminary planning stage. The manual, as it is now structured, is not stratified by speed ranges, but rather by the function of the facility or component. Where speeds are a factor of the element upper limits are not stressed. The purpose of this chapter is to identify the applicable speeds for the elements in the manual common to this chapter and use them as a base for developing high-speed criteria. The speed range stratification starts with that practical, given the limitations of existing facilities, to the super speeds of new facilities.

Chapter 17 considers present foreign high-speed rail technical capabilities and operating characteristics and extrapolates them to North American passenger and freight railroad experience to develop recommended practice for high-speed rail systems. Previous experience with imported technologies and practices has shown that modifications are often needed to successfully adapt them to the climatic, maintenance, operating, and regulatory environments found in North America.

System safety parameters, economics, and design philosophies must also be evaluated in the North American context.

The traditional manual material, for the most part, contains “stand-alone” recommended practices for the fixed plant of railways. This Chapter encompasses high-speed rail as a system; i.e., combining the planning, design, and construction of the facility with the specification and operating characteristics of the vehicle, including propulsion and control system considerations.

There are subparts of the Chapter that are the same as existing recommendations in the manual and where this occurs a reference is made to the existing Chapter and paragraph number. New and existing material that requires technical enhancement is presented based on existing high-speed rail systems and the expertise of committee members.

¹ The material in this and other chapters in the AREMA *Manual for Railway Engineering* is published as recommended practice to railroads and others concerned with the engineering, design and construction of railroad fixed properties (except signals and communications), and allied services and facilities. For the purpose of this Manual, RECOMMENDED PRACTICE is defined as a material, device, design, plan, specification, principle or practice recommended to the railways for use as required, either exactly as presented or with such modifications as may be necessary or desirable to meet the needs of individual railways, but in either event, with a view to promoting efficiency and economy in the location, construction, operation or maintenance of railways. It is not intended to imply that other practices may not be equally acceptable.

TABLE OF CONTENTS

Part/Section	Description	Page
1	Introduction	17-1-1
1.1	General Information.....	17-1-1
1.2	Safety/Security.....	17-1-1
2	Corridor Planning Considerations	17-2-1
2.1	General Information.....	17-2-3
2.2	Planning.....	17-2-4
2.3	Data Collection.....	17-2-7
2.4	Corridor Identification.....	17-2-8
2.5	Corridor Evaluation.....	17-2-9
2.6	Identification of Technology.....	17-2-10
2.7	Multi-modal Interfaces.....	17-2-19
2.8	Corridor Implementation Considerations.....	17-2-21
3	Track and Roadway Considerations	17-3-1
3.1	General Information.....	17-3-3
3.2	System Design Criteria.....	17-3-3
3.3	Clearances.....	17-3-9
3.4	Right of Way Design Criteria and Considerations.....	17-3-9
3.5	Track and Roadway Considerations.....	17-3-13
4	Facilities and Structural Considerations	17-4-1
4.1	General Information.....	17-4-3
4.2	Passenger Facilities.....	17-4-3
4.3	Multi-modal Facilities.....	17-4-3
4.4	Yards and Shops.....	17-4-4
4.5	Bridges and Drainage Structures.....	17-4-4
4.6	Crash Walls.....	17-4-4
4.7	Tunnels.....	17-4-4
5	Vehicle Considerations	17-5-1
5.1	General Information.....	17-5-2
5.2	General Considerations.....	17-5-2
5.3	Design Considerations.....	17-5-4
5.4	Rolling Stock.....	17-5-11
6	Signals, Communications, and Propulsion Considerations	17-6-1
6.1	General Information.....	17-6-2
6.2	Operations Centers.....	17-6-2
6.3	Signal Systems.....	17-6-2
6.4	Communications Systems.....	17-6-15
6.5	Propulsion Systems.....	17-6-15
7	Maintenance of Way Considerations	17-7-1
7.1	General Information.....	17-7-3
7.2	Maintenance Philosophy.....	17-7-3
7.3	Inspection, Evaluation, and Planning.....	17-7-3
7.4	Right of Way Maintenance.....	17-7-3
7.5	Track Maintenance Limits.....	17-7-3

TABLE OF CONTENTS (CONT)

Part/Section	Description	Page
7.6	Track Maintenance Operations	17-7-4
7.7	Structures Maintenance Operations	17-7-4
7.8	Signal and Communications Maintenance Operations	17-7-4
7.9	Propulsion System Maintenance Operations	17-7-5
7.10	Facility Maintenance Operations	17-7-5
References		17-R-1

INTRODUCTION

The Chapters of the AREMA Manual are divided into numbered Parts, each comprised of related documents (specifications, recommended practices, plans, etc.). Individual Parts are divided into Sections by centered headings set in capital letters and identified by a Section number. These Sections are subdivided into Articles designated by numbered side headings.

Page Numbers – In the page numbering of the Manual (17-2-1, for example) the first numeral designates the Chapter number, the second denotes the Part number in the Chapter, and the third numeral designates the page number in the Part. Thus, 17-2-1 means Chapter 17, Part 2, page 1.

In the Glossary and References, the Part number is replaced by either a “G” for Glossary or “R” for References.

Document Dates – The bold type date (Document Date) at the beginning of each document (Part) applies to the document as a whole and designates the year in which revisions were last made somewhere in the document, unless an attached footnote indicates that the document was adopted, reapproved, or rewritten in that year.

Article Dates – Each Article shows the date (in parenthesis) of the last time that Article was modified.

Revision Marks – All current year revisions (changes and additions) which have been incorporated into the document are identified by a vertical line along the outside margin of the page, directly beside the modified information.

Proceedings Footnote – The Proceedings footnote on the first page of each document gives references to all Association action with respect to the document.

Annual Updates – New manuals, as well as revision sets, will be printed and issued yearly.