



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Signalling)

Category: Standard

Braking Distance

SDS 03

Applicability

New South Wales	✓	CRIA (NSW CRN)	✓
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Primary Source

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Document Status

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1.3	4 June 2010	Standards	Manager Standards	Exec Manager SS&P 25/06/2010	CEO

Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.1	1 September 2004		Reformatting to ARTC Standard.
1.2	14 March 2005	Disclaimer	Minor editorial change. Footer reformatted.
1.3	4 June 2010		Principle 3.1 and Sections 3.2.1, 3.2.2 and 3.2.3 of Principle 3.2 transferred to ESD-05-01. Some line references were removed from the table in the Attachment to Principle 3.2 to reflect the current ARTC Network.

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3 Braking Distance

This principle addresses the concepts and definitions of braking distance and its effect on the requirements and design of a signalling system.

3.1 Principle No. 3.1 - Braking Distance Concepts and Definitions

Refer to Section 5 Braking Distance Concepts and Definitions in ESD-05-01 Common Signal Design Principles: S1 - Signalling Locking and Train Dynamics.

3.2 Principle No. 3.2 – Determination of Braking Distance

3.2.1 Introduction

Refer to Section 5 Braking Distance Concepts and Definitions in ESD-05-01 Common Signal Design Principles: S1 - Signalling Locking and Train Dynamics.

3.2.2 Service Braking (SB) Curves

Refer to Section 5 Braking Distance Concepts and Definitions in ESD-05-01 Common Signal Design Principles: S1 - Signalling Locking and Train Dynamics.

3.2.3 Determination of Longest Braking Distance

Refer to Section 5 Braking Distance Concepts and Definitions in ESD-05-01 Common Signal Design Principles: S1 - Signalling Locking and Train Dynamics.

3.2.4 Attachment to Principle 3.2

Applicable Signalling Braking Curves for Particular Lines

The following table outlines which train braking distance table applies to which ARTC line.

Line	Braking Requirements (Signal Spacing)
North	
Hamilton Junction – Maitland	GW40, XPT
South	
Enfield – Casula	GW40 (<80), XPT
Casula – Macarthur	GW40, XPT
Metropolitan Goods Lines	
Enfield – Sefton Park Junction	GW40 (<80)
Flemington – Enfield	GW40 (<80)
Enfield – Meeks Road Junction	GW40 (<80)
Wardell Road – Rozelle	GW30
Enfield Yard Area	Shunt Signals only
Marrickville Loop – Botany	GW40 (<80)
South	
Macarthur – Moss Vale	GW40, XPT
Moss Vale – Junee	GW40, XPT
Junee – Albury	GW40, XPT

Joppa Junction – Canberra	GW16, XPT
Cootamundra – Griffith	GW 16 (Note 1)
Griffith – Hillston	GW 16 (Note 1)
Junee – Griffith	GW 16 (Note 1)
West Wyalong – Burcher	GW 16 (Note 1)
Ungarie – Naradhan	GW 16 (Note 1)
Barmedman – Rankin Springs	GW 16 (Note 1)
Stockinbingal – Parkes	GW30
Demondrille – Cowra	GW 16 (Note 1)
Cowra – Eugowra	GW 16 (Note 1)
Koorawatha – Grenfell	GW16 (Note 1)
Unanderra – Moss Vale	GW30
	Note 1: Branch lines generally low speed and GW16 allowance should not be an excessive requirement.
West	
Lithgow – Wallerawang	GW30, GW10, XPT
Wallerawang – Charbon	GW 10 Up, GW Down
Wallerawang – Tarana	GW30, XPT
Tarana – Bathurst (Kelso)	GW30, XPT
Bathurst – Orange	GW30, XPT
Orange – Parkes	GW30
Parkes – Broken Hill	GW40
Orange – Dubbo	GW30, XPT
Dubbo – Narromine	GW30
Narromine – Parkes	GW30
Narromine – Cobar	GW 16
Dubbo – Ulan	GW30
Dubbo – Coonamble	GW 16 (Note 1)
Nevertire – Warren	GW 16 (Note 1)
Bogan Gate – Tottenham	GW16 (Note 1)
North	
Werris Creek – Boggabri	GW30, XPT (<140)
Boggabri – Moree	GW16 (Note 1), XPT (<140)
Narrabri – Merrywinebone	GW 16 (Note 1)
Moree – North Star	GW 16 (Note 1)
Moree – Delungra	GW 16 (Note 1)
Moree – Weemelah	GW 16 (Note 1)
Werris Creek – Armidale	GW 16 (Note 1), XPT (<140)
Armidale – Glen Innes	GW 16 (Note 1)
Merrygoen – Werris Creek	GW 16 (Note 1)
Binnaway – Gwabegar	GW 16 (Note 1)
Maitland – Aberdeen	GW30, GW10 Up, GW11 Down
Aberdeen – Werris Creek	GW30

Muswellbrook – Ulan	GW16, GW10 Up, GW11 Down
Maitland – Casino	GW40, XPT
Casino – Greenbank	GW40, XPT
Casino – Murwillumbah	GW 16 (Note 1), XPT
Woodville Junction – Maitland	GW40, GW10 Up, GW11 Down
Sandgate – Kooragang	GW30, GW10 entry, GW11 exit
Kooragang Yard	Shunt Signals only
Port Waratah yard	Shunt Signals only
	Note 1: Branch lines generally low speed and GW16 allowance should not be an excessive requirement.

Note: Where multiple braking curves are specified for particular sections of lines, a check needs to be made on all curves that an adequate distance is provided. As an example, a line requiring braking to GW10, GW16, XPT curves is likely to be constrained by the GW10 braking curve below 80 km/h and the GW16 braking curve around 100–115 km/h. Should XPT speeds generally exceed 140 km/h then the XPT braking curve may become the critical factor.

Braking Curves	GW 16 max	Superfreighter braking (680 m train) 115 km/h
	GW36 max	42 NHFF loaded coal train braking 80 km/h
	GW 10 max	84 NHFF loaded coal train braking 80 km/h
	GW 11	84 NHFF empty coal train braking
	GW40	1500 m long Superfreighter braking 115 km/h max (4x81 class + 3480 tonnes) (26/10/93)
	GW30	1200 m long Superfreighter 115 km/h max (4x81 class + 2760 tonnes) (29/6/93)
	XPT	XPT braking 160 km/h max
Simulated Speed	XPT (<140)	Xplorers and Endeavours braking 140 km/h max. SIM That speed as determined by an MTRAIN simulation run.

Should trains with poorer braking, or higher attainable speeds than those listed for the braking curves be required to operate on the line, then an analysis and safety assessment of the resulting effects on infrastructure and the train operations must be conducted.