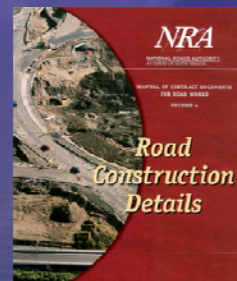
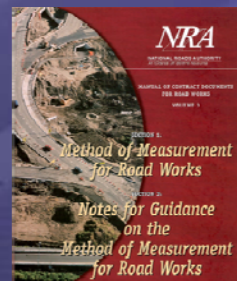
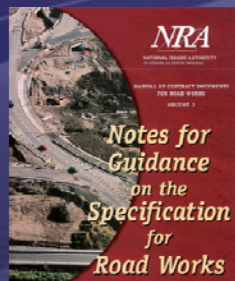
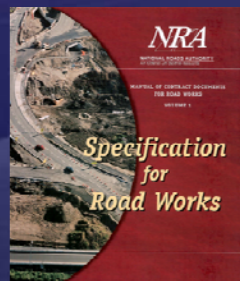
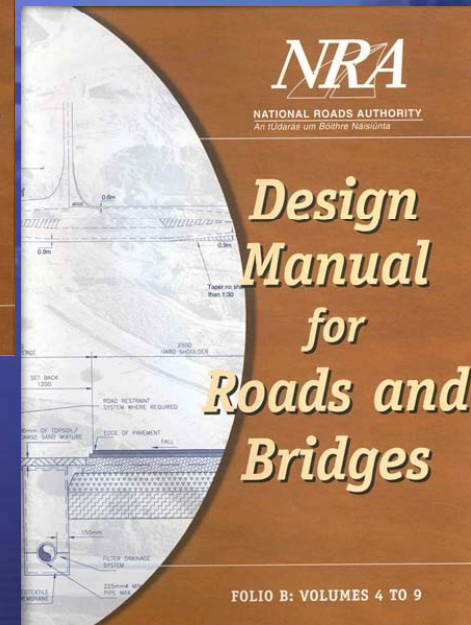
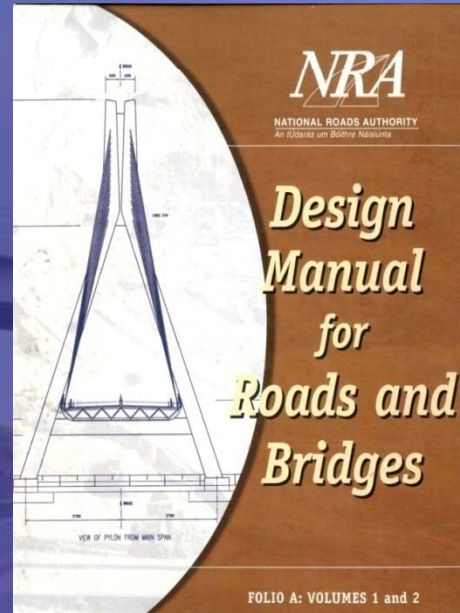
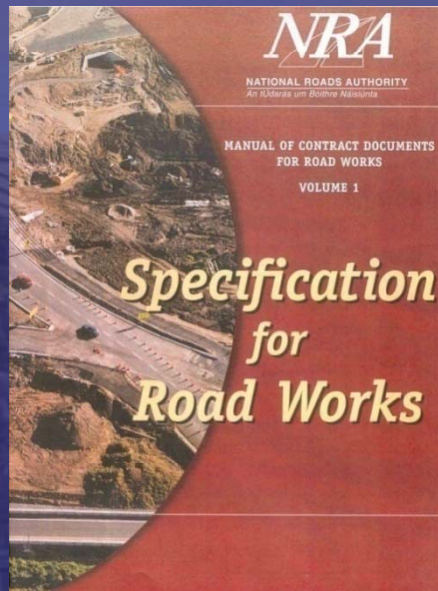


NRA DMRB & MCDRW

Introduction and Programme



Training Objectives

- To give a guided tour of the NRA Design manual for Roads and Bridges (NRA DMRB) and Manual of Contract Documents for Road Works
- To highlight recent and imminent changes in Standards
- To demonstrate how these Standards work in practice:
 - Road Geometry
 - Drainage
 - Pavement
 - Structures
 - Safety Barriers
 - Environmental Barriers

Programme for this morning

- Structure of the NRA DMRB
- Overview of Volumes 1 & 2, Bridges
- Technical Acceptance (NRA BD2)
- Coffee
- Overview of Volume 6, Road Geometry
- Design Speeds and Road Link Design
- Road Link Design Exercise
- Lunch

Programme for this afternoon

- Structure of MCDRW
- Environmental Barriers
- Drainage
- Tea
- Safety Barriers
- Discussion
- Close

Programme for tomorrow

- Introduction to European Standards
- Specification of Bituminous Material
- Cross Sections and Headroom
- Pavement Design
- Junction Design
- Specifications for Piling and Structural Concrete
- Road Safety Audit
- Lines and Signs

Structure of the NRA DMRB

Background

- UK Departmental Standards for Bridges (BD), Highways (HD) and Traffic (TD)
- Complimentary Advice notes (BA, HA, TA)
- Combined into UK DMRB with 15 Volumes split into Sections and Parts
- NRA implemented Volumes 1-9
- Some Standards contain a mix of advice and mandatory requirement. These are defined by a black box.

Structure of the UK DMRB

Vol 1 – Highway Structures – Approval Procedures and General Design

Vol 2 – Highway Structures – Substructures and Special Structures

Vol 3 – Highway Structures – Inspection and Maintenance

Vol 4 – Geotechnics and Drainage

Vol 5 – Assessment and Preparation of Road Schemes

Vol 6 – Road Geometry

Vol 7 – Pavement design and Maintenance

Vol 8 – Traffic Signs and Lighting

Vol 9 – Network – Traffic Control and Communications

Vols 10-15 are not implemented for use in Ireland although the NRA Project Appraisal Guidelines and Environmental Assessment and Construction Guidelines make reference to some parts.

Implementation by NRA

- Revise for Irish practice, procedures, legislation, etc.
- **Minimum change - adopt where possible**
- **NRA Addenda** - For 'X' Read 'Y'
 - Replacement paragraphs
 - Read with DMRB Standard
- **NRA Standards** - Complete replacement
 - For significant changes
- **NRA Increasingly departing from UK practice**

Implementation by NRA

- All Standards are either:
 - Implemented by means of a NRA Addendum
 - or
 - Replaced by a NRA Standard
 - or
 - Not implemented

Implementation by NRA

- **Advice Notes**
 - NOT implemented by NRA
 - Can provide useful guidance
 - Background reading only
 - Users to allow for differences from UK practice
 - NRA have given Advice Note status to some UK Standards which have not been formally implemented

Implementation by NRA

- **NRA Alpha-Numeric Index – Vol 1 Section 0**

- Chapter 1 lists Contents of each Volume
- Chapter 2 lists all documents applicable in Ireland in Alpha-Numerical order with Volume, Section and Part references

Eg: HD39 Footway Design 7.5.5

- Previous individual volume indices are withdrawn

Implementation by NRA

NRA Alpha-Numeric Index – Vol 1 Section 0

Lists date of current NRA Addenda and the date of the UK document to which it applies

Section 1: Links				
6.1.1	NRA TD 9*	Road Link Design	April 2007	N/A
6.1.1A	NRA TA 43*	Guidance on Road Link Design	April 2003	N/A
6.1.1		and Type 3 Dual		
6.1.2				
6.1.3	TA 85	<i>Guidance on Minor Improvements to Existing Roads [and Corrections, January 2002 and August 2002]</i>	-	<i>November 2001</i>
Section 2: Junctions				
6.2.1	TD 22	Layout of Grade Separated Junctions	January 2005	<i>August 1992</i>

NRA ADDENDUM TO A UK STANDARD

Refers to the superseded UK document

Where NRA refer to a document that has been superseded in the UK the date is presented in *Antique Font*

Implementation by NRA

* NRA replacement documents highlighted with an asterisk

Separate Table lists documents NOT applicable in Ireland

NRA Stand alone document – does not refer to a UK standard

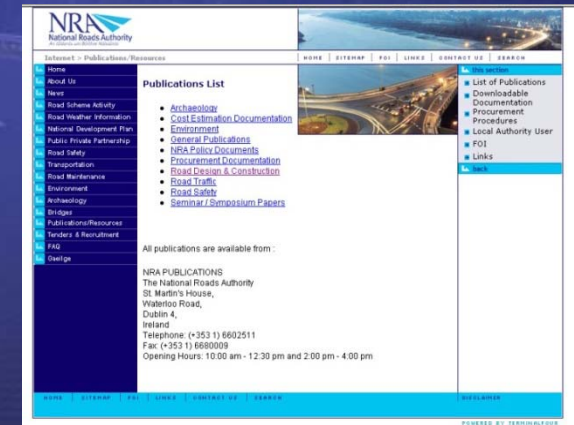
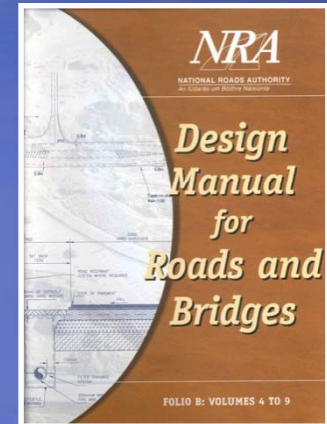
Section	Document ID	Document Title	Issue Date	Status
Section 1: Links				
6.1.1	NRA TD 9*	Road Link Design	April 2007	N/A
6.1.1A	NRA TA 43*	Guidance on Road Link Design	April 2003	N/A
6.1.1B	NRA TD 10*	Road Link Design for Type 2 and Type 3 Dual Carriageways	December 2007	N/A
6.1.2	NRA TD 27*	Cross Sections and Headroom	December 2007	N/A
6.1.3	<i>TA 85</i>	<i>Guidance on Minor Improvements to Existing Roads [and Corrections, January 2002 and August 2002]</i>	-	<i>November 2001</i>
Section 2: Junctions				
6.2.1	TD 22	Layout of Grade Separated Junctions		

UK Document for background reading

Advice Note Status indicated by italics

Format of the NRA DMRB

- Originally two loose leaf folios:
- **Folio A** (Bridges)
 - General introduction and index - NRA Standards and Addenda for Vols 1 & 2
- **Folio B** (Roads)
NRA Standards and Addenda for Vols 4 – 9
- **Current Standards now published on NRA website**
 - under Publications / Road Design and Construction
 - zip file with linked index
 - summary of latest changes



Road Geometry Handbook

- “Pocket” Handbook for road layout design of at grade rural roads
- Contained extracts from NRA TD9, NRA TD27 and composite version of TD41 and TD42 standards and addenda
- All elements are now **SUPERSEDED**
New NRA TD41- 42 provides a composite standard



Structure of the NRA DMRB

Any Questions



Volume 1 - Bridges: Approval Procedures & Design



Volume 1 - Bridges, Approval Procedures & Design

- Section 0: Introduction
- Section 1: Approval Procedures
- Section 2: Alternative Designs
- Section 3: General Design

Volume 1, Section 0: Introduction

2 No NRA Documents:

1.0.A Introduction to the Manual

1.0.B Alpha-Numeric Index

Volume 1, Section 1: Approval Procedures

1 No NRA Standard:

NRA BD 2/09 Technical Acceptance of Road Structures on Motorways and other National Roads

Volume 1, Section 2: Other Procedural Documents

1 No NRA Addendum:

BD 36/92 Evaluation of Maintenance Costs in
Comparing Alternative Designs

1 No Advice note:

BA 28/92 Evaluation of Maintenance Costs in
Comparing Alternative Designs

Volume 1, Section 3: General Design

2 No NRA Standard:

NRA BD 24/00 Design of Concrete Bridges
(Use of BS 5400 Part 4)

NRA BD 57/01 Design for Durability

12 No NRA Addenda

for the rest of the BDs in Section 3

Volume 1, Section 3: General Design

11 No NRA Addenda implementing UK Standards

- Use of BS 5400
- Loadings
- Aerodynamics
- Early Thermal Cracking.
(3 No old BE Tech Memos not implemented)

1 No Advice Note with an NRA Addenda

- BA 42 Integral Bridges

Volume 1, Section 3: General Design

9 No UK Advice Notes

- Use of particular materials and processes
- Hydraulic Action
- Guidance related to Standards

2 No UK Standards given status of Advice Note

- Fibre Reinforced Polymers

Volume 2: Substructures & Special Structures



Volume 2 - Bridges, Substructures & Special Structures

- Section 1: Substructures
- Section 2: Special Structures
- Section 3: Materials & Components
- Section 4: Paints & Protective Coatings

Volume 2, Section 1: Substructures

6 No NRA Addenda implementing UK Standards

- Reinforced Clay Brick Retaining Walls
- Embedded Retaining Walls
- Crib Walls
- Strengthened/Reinforced Soil Walls
- Backfilled Retaining Walls
- Foundations

1 No Advice Note

- Rockbolts

Volume 2, Section 2: Special Structures

10 No NRA Addenda implementing UK Standards

- Lighting Columns, Sign Gantries
- Corrugated Steel Buried Structures
- Enclosures
- Footbridges
- Tunnels
- Concrete Box Culverts, Buried pipes
- Masts for CCTV, cameras and signs

Volume 2, Section 2: Special Structures

1 No NRA Standard

- NRA TD19 Safety Barriers

2 No Advice Notes

- Guidance related to standards

1 No UK Standard given status of Advice Note

- Masonry Arches

Volume 2, Section 3: Materials & Components

1 No NRA Standard

- NRA BD52 Bridge Parapets

4 No NRA Addenda implementing UK Standards

- Bearings, Expansion Joints
- Waterproofing
- Weathering Steel

6 No Advice Notes

- Guidance related to standards plus permanent formwork

Volume 2, Section 4: Paints & Protective Coatings

2 No NRA Addenda implementing UK Standards

- QA Scheme for Paints
- Impregnation of Concrete Structures

2 No Advice Notes

- Guidance related to standards

Volumes 1 & 2: Bridges

Eurocodes ?

Existing Standards only Applicable to
Assessment and Strengthening

New BD100 anticipated

Volumes 1 & 2: Bridges

Any Questions

