

## **NRA ADDENDUM TO**

### **BD 81/02**

## **USE OF COMPRESSIVE MEMBRANE ACTION IN BRIDGE DECKS [and CORRECTION]**

**December 2002**

Standard BD 81/02 – Use of Compressive Membrane Action in Bridge Decks [and Correction, August 2002]– is applicable in Ireland with the following amendments:

### **GENERAL**

1. BD 81/02 is applicable only for the design of new bridges. Unless otherwise agreed with the National Roads Authority, it is not applicable for the assessment of existing bridges on national roads.
2. At several locations:
  - For: “Departmental Standard”  
Read: “Standard”;
  - For: “design and assessment”  
Read: “design”;
  - For: “BD 24”  
Read: “NRA BD 24”.

## SPECIFIC

1. Page 1/1, Paragraph 1.1, line 4:  
For: “BD 24 and BD 44”  
Read: “NRA BD 24”.
2. Page 1/1, Paragraph 1.2, line 4:  
For: “Technical Approval Authority”  
Read: “National Roads Authority”.
3. Page 1/1, Paragraph 1.7:  
Delete Paragraph 1.7 and replace with:  
  
“1.7 This Standard shall be used for the design of road bridges on national roads, to utilise the beneficial effects of membrane action where adequate deck slab restraint exists. The Standard should be applied to the design of schemes already being prepared unless, in the opinion of the National Roads Authority, application would result in significant additional expense or delay progress. In such cases, Design Organisations should confirm the application of this Standard to particular schemes with the National Roads Authority.”
4. Page 2/1, Paragraph 2.7, line 2:  
For: “shall be designed or assessed in accordance with BD24 or BD44 as appropriate:”  
Read: “shall be designed in accordance with NRA BD 24:”.
7. Page 2/1, Paragraph 2.7 ii), line 1:  
For: “Engineer”  
Read: “design engineer”.
6. Page 2/1, Paragraph 2.8:  
Delete Paragraph 2.8 and replace with:  
  
“2.8 Loadings shall be in accordance with BD 37, Loads for Highway Bridges.”
7. Page 3/1, Paragraph 3.2, lines 3 and 6:  
For: “Overseeing Organisation.”  
Read: “National Roads Authority.”;  
  
For: “Engineer”  
Read: “design engineer”.
8. Page 4/1, Chapter 4:  
Delete Chapter 4.

[Note: the following two amendments are required to the original Highways Agency May 2002 issue of BD 81/02, but have been incorporated in the Correction issued by the Highways Agency in August 2002]

9. Page 5/1, Paragraph 5.4, line 3:  
For: " $\epsilon_c = -400 + 60f_c - 0.33f_c^2$  Equation 2"  
Read: " $\epsilon_c = (-400 + 60f_c - 0.33f_c^2) \times 10^{-6}$  Equation 2".
  
10. Page 5/1, Paragraph 5.6, line 3:  
For: " $k = 0.525(4.3 - 16.1\sqrt{3.3 \times 10^{-4} + 0.1243R})$  Equation 4"  
Read: " $k = 0.0525(4.3 - 16.1\sqrt{(3.3 \times 10^{-4} + 0.1243R)})$  Equation 4".
  
11. Page 5/1, Paragraph 5.8, line 1:  
For: "The ultimate predicted load"  
Read: "The ultimate predicted failure load".
  
12. Page 5/1, Paragraph 5.9:  
Delete Paragraph 5.9 and replace with:  
  
"5.9 Until further research is available, where a deck slab is subject to loading from two wheels (either two wheels on one axle or two wheels on adjacent axles), the ultimate predicted failure load for either of those wheels,  $P_{pd}$ , shall be taken as:  
  
 $P_{pd} = 0.65P_{ps}$  Equation 7"
  
13. Page 5/2, Paragraph 5.10(b), line 7:  
For: "curb,"  
Read: "kerb,".
  
14. Page 5/2, Paragraph 5.10(d), line 2:  
For: "shall be designed or assessed in accordance with BD 24 or BD 44 as appropriate."  
Read: "shall be designed in accordance with NRA BD 24."
  
15. Page 6/1, Section 6.1, lines 4 and 8:  
For: "Departmental Standard BD 24/92: Design of Concrete Bridges. Use of BS 5400: Part 4: 1990."  
Read: "NRA BD 24: The Design of Concrete Road Bridges and Structures: Use of BS 5400: Part 4: 1990 (NRA DMRB 1.3.1).";  
  
For: "Departmental Standard BD 37/88: Loads for Highway Bridges."  
Read: "BD 37: Loads for Highway Bridges (DMRB 1.3.14)."

16. Page 7/1, Chapter 7:  
Delete text and replace with:

“7.1 All technical enquiries or comments on this Standard should be sent in writing to:

Head of Project Management and Engineering  
National Roads Authority  
St Martin’s House  
Waterloo Road  
Dublin 4”



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E O’CONNOR  
Head of Project Management and  
Engineering