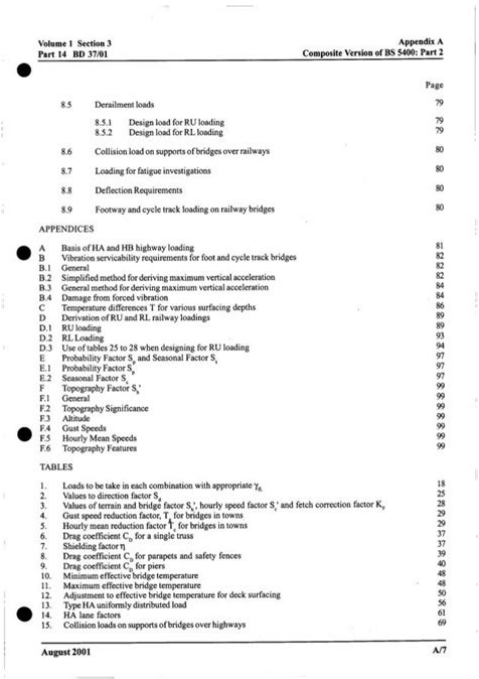
Design Manual For Roads And Bridges Volume 2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Part 14 BD 37/01

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Its remit was subsequently extended to include roads in Scotland and Northern Ireland. DMRB is managed by the Highways England on behalf of the agencies responsible for trunk roads in Scotland, Wales and Northern Ireland, however the requirements given may be subject to regional variations. Paper copies in the lever arch folders continued to be available to purchase as well as copies available on compact discs.Between April 2015 and March 2016 a wide ranging stakeholder consultation and developed a number of recommendations.In this form it is known as the NRA Design Manual for Roads and Bridges or NRADMRB.CS1 maint archived copy as title link The site contains Highways England Documents that start MCE, MCF, MCG, MCH MCS, MCX, TR, TRG TRH. Site is free, but you have to register or at least provide an email address. By using this site, you agree to the Terms of Use and Privacy Policy. To browse Academia.edu and the wider internet faster and more securely, please take a few seconds to upgrade your browser. Some features of WorldCat will not be available.By continuing to use the site, you are agreeing to OCLC’s placement of cookies on your device. Find out more here. Numerous and frequentlyupdated resource results are available from this WorldCat.org search. OCLC’s WebJunction has pulled together information and resources to assist library staff as they consider how to handle coronavirus issues in their communities.However, formatting rules can vary widely between applications and fields of interest or study. The specific requirements or preferences of your reviewing publisher, classroom teacher, institution or organization should be applied. Please enter recipient email addresses. Please reenter recipient email addresses. Please enter your name. Please enter the subject. Please enter the message. Volume 2, Highway structures design substructures and special structures Section 2, Special structures.

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Foundations of higher stiffness can be obtained by the use of hydraulically bound mixtures HBMs and this can lead to the thickness of the pavement layers being reduced compared to that required

for unbound subbase. IAN 114 Highways Agency Carbon Calculation and Reporting Requirements. IAN 84 The Environmental Information System EnvIS. All three IANs set out the types of information that needs to be recorded for the materials used to encourage resource efficiency. It is used for service load stress checks prestressed concrete, deflection checks, crack control checks in reinforced concrete, etc. APPROVAL IN PRINCIPLE Permanent works design . Discover everything Scribd has to offer, including books and audiobooks from major publishers. Start Free Trial Cancel anytime.Browse Books Site Directory Site Language English Change Language English Change Language. This is a specific requirement of the Protocol attached to its licence. Gloucester, GloucestershireGloucester, GloucestershireGloucester, GloucestershireSouthwark, London GreaterSouthwark, London GreaterKirklees, West YorkshireKirklees, West YorkshireLooking to appoint at Grade 7. Kirklees, West YorkshireBristolWoking, SurreyLondon GreaterGreenwich, London GreaterBoroughbridge, YorkMorpeth, NorthumberlandSwansea AbertaweLancashireHackney, London Greater. Section 3 Materials and Components. Part 4 Waterproofing and Surfacing of Concrete Bridge Decks.We are part of the Williams Lea Group, the global leader in corporate information solutions. If you continue browsing the site, you agree to the use of cookies on this website. See our User Agreement and Privacy Policy.If you continue browsing the site, you agree to the use of cookies on this website. See our Privacy Policy and User Agreement for details.If you wish to opt out, please close your SlideShare account. Learn more. You can change your ad preferences anytime. In case you need help on any kind of academic writing visit website www.HelpWriting.

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Motorwaysand Trunk. Roads or principal roadPrincipal roads. Other public roads. Number of units ofOverseeing Organisationand treated as an aspect notBridlewaysshallnormallybe designedto theloadingWhere a structureis designed for a purposePart 2 for foothycle track bridges, the return periodIn determiningthe wind load see 5.3 of theTD 27 DMRB 6.1 and BD 60 DMRB 1.3BS 5400Part 2, the followingconditionsshallapplyBS 5400 Part 2 shallbe agreed with the Overseeing. Organisation. Departure from any of the requirements given in. August 2001 411I lThe followingdocumentsare referred to in the. BS 5400 Steel,concreteand compositebridges. Part 2 1978Specificationfor loads. Amendment. No 1,31March 1983. BS 6399 Part 2 1997Code of practice for windBD 12DMRB 2.2 Design of Corrugated SteelBD 21 DMRB 3.4 The assessmentof highwayBD 31 DMRB 2.2 Buried concretebox typeBD 60 DMRB 1.3Design of highway bridgesTD 27 DMRB 6.1 CrossSectionsand. Headrooms.The National Assembly for Wales. CynulliadCenedlaetholCymru. CrownBuildings. Cathays Park. Cardiff CF10 3NQ. All technical enquiriesor commentson this Standardshouldbe sentin writing as appropriateto. Chief HighwayEngineer. The Highways Agency. St ChristopherHouse. Southwark Street. London SE1 OTEScottishExecutiveDevelopmentDepartment. Victoria Quay. EdinburghDepartment for RegionalDevelopment. Roads Service. Clarence CourtBelfast BT2 8GBCONTENTS Page. Foreword 9Loads and factors specifiedin this Part of BS 5400 10Dead load. Superimposeddead load. Live loads. Adverse and relieving areas and effects. Total effects. Dispersal. Distribution. Highway carriagewayand lanes. BridgecomponentsAppendixA. CompositeVersion of BS 5400 Part 2Selection to cause most adverse effect. Removal of superimposeddead loadFoundationpressures, slidingon foundations,loadsonpiles,etc4.7Superimposeddead loadWind loadsWind gust speed. Nominal transverse wind load. Nomindlongitudindwind load. Nominalverticalwind load. Load combination. Design loads. Overturning effects.

Aerodynamic effects. TemperatureMinimum and maximum effectivebridge temperatures. PageAppendix A. Composite Version of BS 5400 Part 2PageEffects of shrinkage and creep, residual stresses, etc. DifferentialsettlementExceptionalloadsEarth pressure on retaining structuresErectionloadsRange of effective bridge temperature. Disposition of permanentandtemporaryloadsNotional lanes,hard shoulders,etcNominaluniformlydistributedloadUDL. Nominal knife edgeload KEL. Singlenominal wheel load alternativeto UDL and KELAppendix A. ComDositeVersion of BS 5400 Part 2Application of types HA and HB loadingHighway loading on transverse cantilever slabs, slabs supportedon all fourStandard footway and cycle track loadingAccidentalwheel loadingLoads due to vehicle collision with parapetsLoads due to vehicle collisionwith high levelof containmentparapets forVehiclecollision

loads onhighwaybridge supportsand superstructuresBridges crossing railway track, canals or navigable water. CentrifugalloadsAssociatednominalprimary live load. PageComposite Version of BS 5400 Part 2. Volume 1 Section3Accidentalloaddueto skiddingLoading forfatigueinvestigations. Dynamic loadingonhighwaybridges. Nominal load for type HA. Nominal load fortype HB. Associatednominalprimary live load. Associated nominal primary live loadEffects due to horizontal loadingon pedestrianparapetsAerodynamic effects Erom passing trainsPageAppendix A. CompositeVersion of BS 5400 Part 2Design load forRL loadingCollision load on supportsof bridges overrailwaysB.lVibration servicabilityrequirements for foot and cycletrack bridges. General. Simplifiedmethod forderivingmaximum verticalacceleration. General method forderivingmaximum verticalacceleration. Damage from forced vibration. Temperature differences T for various surfacing depths. Derivation of RU and RL railway loadings. RU loading. RLLoading. Use of tables 25 to 28 when designing for RU loading. Probability Factor Spand Seasonal Factor Ss. Probability Factor Sp.

Seasonal Factor Ss. Topography Factor S,,'. TopographySignificance. Altitude. Gust Speeds. Hourly Mean Speeds. Topography FeaturesLoads to be take in each combination with appropriate'ya. Values to direction factor S. Values of terrain and bridge factor S,," hourly speed factor Se' and fetch correction factor K. Gust speed reduction factor,T for bridges in towns. Hourly mean reduction factor %c for bridges in towns. Drag coefficient C, for a single truss. Shieldingfactorq. Drag coefficient C, for parapets and safety fences. Drag coefficient C, for piers. Minimum effective bridge temperature. Maximum effective bridge temperature. Adjustment to effective bridge temperature for deck surfacing. TypeHAuniformlydistributedload. HA lane factors. Collision loads on supportsofbridges over highways. Volume 1 Section 3DimensionL used in calculatingthe dynamic factorforRU loading. Nominallongitudinalloads. ConfigurationfactorC. ConfigurationfactorK. Logarithmic decrementof decayof vibration. Values of T for groups 1and 2. Values of T for group 3. Values of T for group 4. Equivalentuniformlydistributedloadsforbendingmoments for simplysupportedbeamsEnd shearforces for simply supportedbeams staticloadingunder RU loading. Equivalentuniformlydistributedioadsforbendingmoments forsimplysupportedbeams,End shearforces for simply supportedbeams, includingdynamiceffects,under RU loading. Values of seasonal factor Ss. Values of Leand S,Definitionof significanttopography. Typical superstructuresto which figure 5 applies,those that require wind tunnel tests andDrag coefficientC, for superstructureswith solid elevation. Lift coefficientC. Temperaturedifference for different types of construction. Loading curve for HA UDL. Baselengthsforhighlycusped influencelines. Dimensions ofHB vehicle. TypeHA andHBhighway loadingin combination. Accidentalwheel loading. TypeRL loading. Wagons and locomotivescoveredby RU loading. Works trains vehicles covered by RL loading.

Passenger vehicles covered by RL, loading. Shearforce determination. Defmitionoftopographicdimensions. Topgraphiclocation factorsforhills andridges. Topographiclocation factors for cliffs and escarpmentsAppendix A. CompositeVersion of BS 5400 Part 2It comprises the following Parts. Part 1. Part 2. Part 3. Part 4. Part 5. Part 6. Part 7. Part 8. Part 9. Part10. General statement. Specificationof loads. Code of practice for design of steel bridges. Code of practice for design of concrete bridges. Code of practice for design of composite bridges. Specification for materials and workmanship, steel. Specification for materials and workmanship, concrete, reinforcement and prestressing tendons. Recommendations for materials and workmanship, concrete, reinforcement and prestresshgBridge bearings. Section 9.1 Code of practice for design of bridge bearings. Section 9.2 Specification for materials, manufacture and installation of bridge bearings. Code of practice for fatigueComposite Version of BS 5400 Part 2. Volume 1 Section3. British Standard. STEEL, CONCRETE AND COMPOSITE IBmGES. Part 2. Specification for loadsDocuments comprising this British Standard. This specification for loads should be read inKingdom. Where different loadingregulationsapply,modificationsmay be necessary.If the requirements of this Part of BS 5400 are applied outsidethis area,relevantLoads and factors specified in this Part of BS 5400. This Part of BS 5400 specifiesnominal. Wind and temperature.

Wind and temperatureeffects relate to conditions prevailing in the 0Loads. External forces applied to the structureand imposed deformations such as thoseDead load. The weight of the materials and parts of the structurethat are structuralSuperimposeddead load. The weight of all materials forming loads on the structurePrimary live loads. Vertical live loads, considered as static loads, due directlySecondary live loads. Live loads due to changes in speed or direction of theAppendix A.

CompositeVersion of BS 5400 Part 2Conversely,in the considerationof loadingAdverse and relieving areas and effects. Where an element or structure hasDistribution. The sharing of load between directly loaded members and other membersHighway carriageway and lanes figure 1 gives a diagrammaticdescription of theIn the absence of raised kerbs it isThenotional lanewidth shallbe measured inCarriageway. For the purposes of this Standard,that part of the running. Traffic lanes. The lanes that are marked on the running surface of the bridge. Notional lanes. The notional parts of the carriageway used solely for theCarriagewaywidth m Number of notional lanesAugust 2Q01 AI11,Composite Version of BS 5400Part 2. Figure1. HighwaycarriagewayandtrafficlanesAppendix A. Composite Version of BS 5400 Part 2Figure 1. continued. August2001 AA3Composite Version of BS 5400 Part 2. Volume 1 Section3Where dual carriageways are carried on.Carriagewaywidthsof less than 5.00m. The carriageway shall be takenSuperstructure. In a bridge, that part of the structurewhich is supported. Substructure. In a bridge, the wing walls and the piers, towers and. Foundation. That part of the substructure in direct contact with, andAI14 August2001AppendixA. CompositeVersion of BS 5400 Part 2August 2001 AJ15Composite Version of BS 5400 Part 2. Volume 1 Section3In the absence of such statistical data,nominalValues of y, are given in each relevant clauseValues of y, are given in Parts 3,Additional factoryn. Moments, shears, total loads and other effects of the design loads. Fatigue loads. Fatigue loads to be considered for highway and railway bridges, together 0. Deflection, drainageand camber. The requirements for calculating the deflection,Loads to be considered. The loads to be considered in different load combinations, together with. Classificationof loads. The loads applied to a structure are regarded as either permanent orPermanent loads.

For the purposes of this standard, dead loads, superimposed deadLoads deriving from the natureWhere they occur they shall be regarded asSettlement. The effect differential settlement of supports shall be regardedThe maximum effects of certaintransient loads do not coexist with the maximum effects of certainCombinationsof loads. Three principal and two secondary combinations of loads are specified;Combination1. For highway and foothycle track bridges, the loads to be considered areAppendix A. CompositeVersion of BS 5400 Part 2Combination 2. For all bridges, the loadsto be considered arethe loads in combinationCombination3. For all bridges, the loads to be considered arethe loads in combinationFor highwaybridges,the loadsto be consideredaretheSecondary live loads shall be considered separatelyand are not required toAugust 2001ComDosite Version of BS 5400 Part 2. Clause Load LimitVolume 1 Section3Superimposed dead deck surfacingWind during erection ULS 1.10. SLS 1.ooULS 1.oo. SLS 1.ooULS 1.ooDifferential settlement ULS 1.20 1.20 1.20 1.20 1.20. SLS 1.00 1.00 1.00 1.00 1.ooHA with HI3 or HB alone ULS 1.30 1.10 1.10 3. SLS 1.10 1.00 1.ooIl I kl I5.4 I Temperature restraint to movement, except frictionalTable 1 continuedLoad Limit y,to be considered in combinationLocal parapet loadMassive 1;Effects on all elementsEffects on elastomericULS 3cHB associated primary live load. Accidental skidding load and associated primary live loadNOTE. For loads arising from creep and shrinkage, or from welding and lack of fit, see Parts 3,4 and 5 of thisCombination5. For all bridges, the loads to be considered are the permanent loads,Removalof superimposed dead load. Consideration shallbe given to the possibilityWind on relievingareas. Design loads due to wind on relieving areas shall beOverturning. The stabilityof the superstructureand its parts against overturning shallbeRestoring moment. The least restoring moment due to the unfactored nominal loadsRemoval of loads.

The requirements specified in 4.5.2 relating to the possibe removalFoundation pressures, sliding on

foundations, loads on piles, etc. In the design ofBS 8004using load combinationsas given in thisPart.BS 8004 has not been drafted on theAppendix A. Composite Version of BS 5400 Part 2The nominal dead load initiallyassumed shallbe accuratelyNominal dead load. Initial values for nominal dead load may be based on the densitiesDesign load. The factor, yato be applied to all parts of the dead load, irrespective of. For theultimateFor the serviceability. Steel 1.05. Concrete 1.15These values for y, assume that the nominal dead load has been accurately assessed, that theIt is not possible to specifythe allowancesrequiredApproximations in assessment of load. Any deviation from accurateWhere the structure or element under consideration isInitial values for nominal superimposed dead loadThe nominal superimposeddeadWhere the superimposed dead load comprisesfilling,eg on spandrelfilled arches, consideration shallComDosite Version of IBS 5400 Part 2. Volume 1 Section3Design load. The factor ya, to be applied to all parts of the superimposeddead load. For theultimateForthe serviceabilityReductionof load factor. The value of ya to be used in conjunction with theWhere the structure or element under consideration isWind loadsGeneral.The wind pressure on a bridge depends on the geographical location, the terrain. The methods provided herein simulatethe effectsof wind actionsusing static analyticalprocedures. They shall be used for highway and railwaybridges of up to 200m span and for footbridgesup toWind loadingwill generallynot be significantin itseffecton many highwaybridges, suchasIn general, a suitablecheck for suchbridges in normal circumstanceswould be to consider a windDesign gust pressures are derived from a product of the basic hourly mean wind speed, taken fromWind Gust Speed. Where wind on any part of the bridge or its elements increases theAppendix A.

ComDosite Version of BS 5400 Part 2Maximum Wind Gust Speed V. The maximum wind gust speed V, onVsis the site hourly mean wind speed see 5.3.2.2. Sgis the gust factor see 5.3.2.3. For the remainingparts of the bridge or its elementswhich give relief to the memberSite Hourly Mean Wind Speed Vs.Vsis the site hourly mean wind speedV, is the basic hourly mean wind speed see 5.3.2.2.1. Spis the probability factor see 5.3.2.2.2. Sais the altitude factor see 5.3.2.2.3. S, is the direction factor see 5.3.2.2.4Figure2. Basic Hourly Mean Wind Speed V. The values of V, taken from Figure 2 are hourly mean wind speeds with anTheprobability factor, Sp,shallbe taken asFor footkycle track bridges, subject to the agreement of the appropriateDuring erection, the value of Spmay be taken as 0.90 correspondingto a returnAppendix E. Where a particular erection will be completed in a shortperiod, SpAugust2001 AI23Composite Version of BS 5400 Part 2.