CIRCULAR ROADS
CR 2/91

THE DEPARTMENT OF TRANSPORT

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Date: May 1991

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Common Council to the City of London

CIRCULAR ROADS 2/91
This circular supersedes
Circular Roads 29/75

Dear Sir

ASSESSMENT AND STRENGTHENING OF HIGHWAY BRIDGES AND STRUCTURES

INTRODUCTION

1. The 15 year Bridge Rehabilitation Programme for trunk road bridges, announced in November 1987, is now under way. A major part of that programme is the assessment and, where necessary, strengthening of certain bridges and other highway structures in line with the latest technical standards. These reflect the changed nature of present day traffic conditions and also provide for, for example, the use of 40 tonne lorries and 11.5 tonne axle weight from 1 January 1999, as already permitted in other parts of the European Community. Highway authorities acting as agents for the Department will already be aware of its requirements in this respect. The information in this circular is intended for assisting local highway authorities in formulating their strategies for tackling similar work on their own roads in parallel with that on the Department's and on those of neighbouring authorities. This circular also gives details of the new weight restriction signs for weak bridges and Model Traffic Orders to be used for their deployment.

2. Local highway authorities will of course wish to ensure that all bridges, including those they do not own, carrying their roads are in a fit condition for the traffic which may reasonably be expected to use them.

3. The maintenance responsibilities for many bridges not owned by highway authorities are set down in individual agreements. While many of these will place responsibility for assessment and strengthening (as an integral part of maintenance) solely on the owner, others may provide for a shared responsibility with the highway authority.

4. In the case of bridges owned by statutory transport undertakers (British Rail (BR), British Waterways Board (BWB) and London Underground Limited (LUL)), the responsibility of the undertakers for maintaining load carrying capacity is restricted by the provisions of Part VIII of the Transport Act 1968 and in the case of BR and LUL, of the Railway Bridges (Load-Bearing standards), (England and Wales) Order 1972. Generally speaking, apart from bridges built or reconstructed since the 1968 Act came into force, BR and LUL have to maintain highway bridges vested in them to the Department's former standard known as BE4. In the absence of an equivalent order for its bridges, BWB's responsibility is to maintain its bridges to a standard suitable for the traffic which might have used them on or about 1 January 1971, but for practical purposes it will be easier, and not unreasonable, to apply the BE4 standard as for BR and LUL.

5. Where a statutory transport undertaker's bridge already meets the BE4 standard, the highway authority will need to bear the full cost of any work which it wishes to be carried out to bring it up to a higher standard. If a bridge does not meet BE4, the owner should pay an amount equivalent to what it would have cost to make it do so, and the highway authority should pay the balance. (By the same token, if a statutory transport undertaker wishes a bridge to be altered or improved to the benefit of the rail or water traffic which may pass beneath it, the undertaker should pay the extra cost of this work.) When the owner of a bridge and the highway authority agree the extent of work which needs to be done and their respective contribution to the cost, they may also wish to consider the subsequent transfer of ownership to the highway authority subject to a commuted payment from the present owner in lieu of his otherwise on-going maintenance responsibilities.

6. There are continuing discussions between representatives of the Department, the local authority associations and the statutory

transport undertakers about various matters of common interest including, in particular, a basis for sharing the cost of assessing the load carrying capacity of the undertakers' bridges. The outcome of the discussions will be reported to authorities in due course.

7. The information contained in this circular by itself has no significant additional implications for authorities' financial and manpower resources. The funding arrangements for the assessment and strengthening of local authority highway structures are discussed in paragraphs 11 to 13. The resource implications of the relevant sections of the Traffic Signs Regulations are discussed in paragraphs 45 and 46.

BACKGROUND

8. A new Bridge Assessment Code, primarily but not exclusively intended for older short span bridges, was published by the Department in 1984. The code consists of a Departmental Standard, BD 21/84, and an accompanying Advice Note, BA 16/84. It was prepared under the auspices of the Department by a working party consisting of all the major public bridge authorities in the UK. The loading contained in the code covered the effects of all vehicles allowed under the then current Construction and Use Regulations. To obtain reliable estimates of the numbers of structures affected, a census and sample survey exercise, again co-ordinated by the Department, was undertaken in 1986 involving virtually all publicly owned road bridges apart from those on trunk roads. The results were published in the Bridge Census and Sample Survey Report (January 1987). The census identified some 50,000 bridges in Great Britain as qualifying for assessment by the code. From the sample survey it was estimated that around 11,000 of these bridges would not meet the standards.

9. The assessment loading was subsequently enhanced to allow, inter alia, for the effects of the heavier lorries permitted under European Community Directives, and Amendments No. 1 to the Bridge Assessment Code were published in August 1989.

10. The first EC Directive (85/3/ECC) on the weights and dimensions of lorries for use in international transport operations within the EC was agreed in December 1984. This directive set the maximum gross weight of 5 and 6 axled articulated vehicles at 40 tonnes (44 tonnes where a 40 foot ISO container was to be used in combined road/rail transport operations). In July 1986 an Amending Directive (86/360/ECC) was agreed, which set the maximum drive axle weight for these vehicles at 11.5 tonnes. A package of 2, 3 and 4 axled vehicles with a maximum drive axle weight of 11.5 tonnes was adopted by the EC Transport Council in June 1989. An Amending Directive (89/460/ECC) covering this package was published in July 1989 which gave the UK a derogation regarding these vehicles until 1 January 1999. The 2, 3 and 4 axle vehicles, with a reduced maximum drive axle weight of 10.5 tonnes, will be permitted in the UK from 1 January 1993.

FUNDING ARRANGEMENTS FOR LOCAL ROADS

11. Local authority expenditure on highway structural maintenance is capital in nature but has hitherto been financed largely from revenue. In November 1989, it was announced that such expenditure would be progressively supported by Transport Supplementary Grant (TSG) and borrowing approvals and that adjustments would be made to the highway maintenance standard spending assessment for Revenue Support Grant to reflect that the expenditure would no longer be charged to the revenue account.

12. For 1991/92 just over £90 million of TSG and credit approvals has been allocated for expenditure on the structural maintenance of bridges and other road carrying structures so that all bids in authorities' Transport Policies and Programme (TPP) submissions could be accepted in full.

13. The information required in support of bids for expenditure on assessment and strengthening in future years will be included in the relevant annual Departmental circular and the guidance notes for completing the finance forms. Generally however, authorities will be expected to include in the TPP submissions a clear statement of their overall objectives and strategy for tackling the structures in their area, and of the way in which they determine priorities for assessment

and strengthening. They should also indicate the way in which their work programmes are co-ordinated with those of neighbouring highway authorities and also with work on trunk roads so as to minimise the disruption to traffic in their area.

THE DTp PROGRAMME AND ITS TIMETABLE

14. The Department of Transport began its programme of assessment and strengthening of its older short span bridges (known as Stage 1) based on the requirements of the Bridge Assessment Code BD 21/84 in late 1987. The programme was promulgated through TRMM notice 6/88 which set out the respective priorities for both assessment and strengthening, and implementation Standard BD 34/88 (see paragraph 17). Stage 2 (mainly pre-1975 concrete bridges, not included in Stage 1), and Stage 3 (long span bridges) programmes will begin as soon as the relevant technical advice has been published. The priorities for Stages 2 and 3 will be similar to those for Stage 1 but the overall programme is to be considered alongside the requirements of the parallel programme to assess and where necessary strengthen structures on local authority roads. A series of seminars have been held locally to discuss the co-ordination of work affecting structures owned by transport undertakers, local authorities and the Department. Delegates were able to discuss or confirm arrangements which would enable them to manage the programme efficiently and minimise disruption. These arrangements varied depending on local circumstances. A copy of a note produced for the seminars setting out the issues to be considered is at Annex A.

15. In some regions, where the number of outstanding assessments in the Stage 1 trunk road programme is small, co-ordination is being organised by way of a number of geographically convenient local authority groups. Other regions have co-ordinating committees chaired by a Regional Office representative and include representatives from local highway authorities. In London where the situation is most complex, a DTp chaired working party of all bridge owners deals with policy and a LOBEG (London Bridge Engineers Group) Co-ordinating Committee co-ordinates the activities of four geographically convenient groups on which all bridge owners are represented.

Bridge Assessment Code: Departmental Standard BD 21/84 and Advice Note BA 16/84

16. The main standard for assessment is BD 21/84 together with the accompanying Advice Note BA 16/84, both as amended by Amendments No. 1. These contain the various levels of assessment live loading which are derived from the new design loading of BD 37/88 (see paragraph 19) by applying appropriate reduction factors. The assessment loading criteria cover the full range of vehicles (up to 38 tonnes) allowed under the current Construction and Use Regulations as well as those to be permitted in compliance with the relevant EC Directives (see paragraph 10).

Stage 1 Implementation Document: Departmental Standard BD 34/88

17. This standard implements the first stage of the trunk road assessment and strengthening programme, which includes primarily the older short span bridges. The standard sets out the criteria to be used for identifying the relevant structures, and gives procedures for their assessment, strengthening and technical approval. It also introduces the associated technical report forms. Requirements are also given concerning the assessment of structures for HB and other abnormal loads.

18. A revision to BD 34/88 (BD 34/90) and an Advice Note BA 34/90 have been issued to clarify the procedures to be adopted during the assessment stage and prior to undertaking any strengthening work, and inter alia, to amplify the requirements with regard to assessing structures for abnormal loads.

Bridge Loading Standard for Design and Strengthening: Departmental Standard BD 37/88

19. BD 37/88 - 'Loads for Highway Bridges' implements an interim revision of the British Standard BS 5400: Part 2. This Departmental standard, which was produced in collaboration with BSI, supersedes BD 14/82 and includes a major revision of the HA loading. The new short span design loading covers the effects of the full range of vehicles

with 11.5 tonne drive axles and includes a nominal 10 per cent contingency margin to allow for future traffic developments. The loading requirements given in BD 37/88 are being used to design new structures and also any strengthening work on existing ones.

FORTHCOMING DEPARTMENTAL STANDARDS

Stages 2 and 3 Implementation Documents

20. These two standards, covering mainly pre-1975 concrete bridges not included in Stage 1 and long span bridges respectively, will be issued in due course and their publication will indicate the formal start of the corresponding stages. These standards will define the ranges of structures to be included in the two stages and will also contain the relevant technical requirements. Local authority associations and other national bridge owners will be consulted on the documents at draft stage.

Assessment Version of BS 5400: Part 3 Steel Bridges and Part 5 Composite Bridges

21. The Department expects to issue assessment versions of BS 5400: Parts 3 and 5 in due course; work on these documents is currently in hand.

Assessment Version of BS 5400 : Part 4 Concrete Bridges

22. An assessment version of BS 5400: Part 4 has been issued as BD 44/90 with an Advice Note BA 44/90. Calibration studies using a draft version on a variety of bridge types were undertaken prior to issue as were pilot studies on a number of actual bridges. The results of these studies indicated that significant improvements in some areas of assessed capacity could be achieved.

CURRENT RESEARCH WORK

23. The Department, mainly through TRRL, has instigated research and development work in a number of areas relevant to the determination of the load carrying capacity of bridges. Paragraphs 24 to 26 describe some highlights of this work.

Masonry Arch Bridges - Assessment Methods

24. This work is considered to be economically and strategically very significant since the Bridge Census and Sample Survey has indicated that in excess of 2800 highway masonry bridges in Britain are likely to be classed as below standard if assessed using the current somewhat conservative simple method. More accurate methods are therefore being developed which may result in saving a proportion of these bridges. In parallel with this, ten load tests to collapse on redundant masonry arch bridges and full scale models have been carried out by TRRL in the last few years. The results from these tests are being used to examine the various methods of assessment and the associated computer packages. Some interim findings will be included in a forthcoming amendment to BD 21/84.

Older Metal Bridges

25. Another finding of the Bridge Census and Sample Survey is that some 66 percent of older metal bridges are likely to be below standard. Research into the behaviour of trough decks, jack arch bridges and other old metal bridge types is continuing, including tests on redundant bridges, with a view to devise methods for assessing their capacity more accurately than at present. The possibility of using load tests as a means for determining temporary weight restriction levels is also being examined.

Concrete Bridges without Shear Reinforcement

26. A number of shear tests on a series of 30 year old pre-tensioned concrete beams which were constructed without shear reinforcement have recently been carried out by TRRL. Results of this work have influenced the final form of the clauses on shear in BD 44/90. Other similar tests are also being planned.

EMERGENCY ACTION DURING ASSESSMENT

27. If, in the course of an assessment, the assessing engineer considers that the condition of a structure is so inadequate for its purpose that there is a potential risk to public safety, he or she

should inform the bridge owner and the relevant Technical Approval Authority. He or she should at the same time also recommend any immediate action that needs to be taken pending the completion of the full assessment procedures.

28. In assessing the risk to public safety the engineer should take into account relevant factors such as the nature of the structural weakness and any corresponding signs of distress and the recent loading history of the structure itself. He or she should also take account of the probabilities of the occurrence of the critical load combinations within the period prior to the implementation of any temporary or permanent remedial action.

29. If a risk to public safety has been identified at an initial stage of the assessment process by using simple methods, the findings should be immediately confirmed by another relatively quick method of assessment. In choosing an alternative assessment method preference should be given to those which recognise the participation of the complete structure in resisting collapse at the ultimate limit state (eg yield line analysis of slabs) and also those which can model the boundary restraints more realistically.

30. In general, for any structures which are initially considered to be inadequate, the assessing engineer should confirm any preliminary findings by a more accurate method or methods before making a final recommendation as to the appropriate remedial action for the structure in question.

SIGNING OF WEAK BRIDGES

The Present Situation

31. Weak bridges are primarily signed at present with signs to diagrams 626.1 and 628.1 of the Traffic Signs Regulations and General Directions 1981 (SI 1981/859). Very occasionally subplate 627 is also used. Signs to diagram 622.1A are chiefly used for environmental bans on lorries, but on a few occasions have been authorised for use at weak bridges with the addition of a "weak bridge" plate. The weight limits established under Departmental Standard BD 21/84 will apply to all vehicles and not simply to heavy goods vehicles. The use

of variants of diagram 622.1A signs with the weight on the lorry symbol will therefore no longer be appropriate.

Sign Changes in Progress - Metrication

32. With effect from 1 January 1990, a number of signs showing weights in imperial tons and relating to unladen vehicle weights may no longer be used, and have become un-enforceable. The signs are those shown in diagrams 622.1, 626, 628, 639.1, 640.2, 649, 719.3, 806.2, 808.2 and 819 of the Traffic Signs Regulations and General Directions 1975 (SI 1975/1536).

33. The replacements for diagrams 626 and 628 remain, at present, diagrams 626.1 and 628.1 in the 1981 Regulations, but a new sign is to be produced for use at bridges which have been assessed using Departmental Standard BD 21/84. For diagram 622.1 the replacement remains diagram 622.1A in the 1981 Regulations, except that following Circular Roads 1/88 the variant limit is 17 tonnes, and not 16.5 tonnes as shown in the Regulations. The sign at 17 tonnes currently needs to be authorised by the Secretary of State for Transport, but should be used, as it relates to the existing weight limit for two axle HGVs.

New Sign For Weak Bridges

34. A review of the 1981 Regulations is currently in progress. The second consultation document on the revision of the Regulations, issued in October 1990, proposed a new sign, couched in terms of maximum gross weight, and an optional subplate for use at weak bridges. The objective is to make enforcement of the weight limit easier by making it possible to compare the weight on the sign with the plated weight shown in the cab of the vehicle. This will reduce the need for police to use weighbridges in order to ascertain whether a vehicle exceeds the weight limit at a certain bridge. Vehicles which are still in service and are plated with unladen weight only will be permitted to use weak bridges where their unladen weight does not exceed the maximum gross weight stated on the sign.

35. The weight limits that may be shown on the new sign are 3T, 7.5T, 10T, 13T, 17T, 25T and 33T. The three weight limit levels that would be likely to be used most generally are 25T, 17T and 7.5T, which equate to easily identifiable types of goods vehicle. 25T (rounded up for the sign from 24.5T) represents the maximum gross weight of a 3 axle HGV, 17T a 2 axle HGV, and 7.5T a HGV without special rear markings.

36. The new sign would also apply to Public Service Vehicles (PSV). Previous general exemptions for PSVs were justified on the grounds that the restrictions were not necessarily precisely attuned to structural capacity, and that the types of PSV using a particular structure were predictable and controllable. Changes introduced by the Transport Act 1985 mean that the highway authority now has less control over the types of vehicle operating on particular routes. It is also the case that the term "bus" covers a wide range of vehicles, from minibuses to fully laden excursion coaches.

37. The Department recognises the potential effect that the ending of PSV exemptions might have on local services. The safety of the structure and of those crossing it must be the paramount concern. Subject to that basic proviso, it seems reasonable to allow highway authorities some flexibility to meet the needs of particular local situations. It may be that a structure that is unsuitable for general traffic above a certain maximum gross weight can carry occasional PSVs without risking damage.

38. The Department's advice is therefore that local authorities, when making Traffic Regulation Orders imposing weight restrictions at weak structures, may, if they so wish, include exemptions for specific types of PSV. Such exemptions should be based upon analysis of the nature of the structure involved. Exempted vehicles should be issued with permits, to be displayed in or on the vehicle. The exemption would be signed with a plate attached to the weak bridge sign reading "Except permit holders". Special authorisation from the Department would be required for the erection of such plates.

Empty Vehicles

39. It is recognised that for vehicles in the higher weight levels the actual vehicle weight when empty is likely to be sufficiently low as to

be safely borne by the bridge. It has been shown that any bridge which can safely bear a vehicle of 17 tonnes MGW or more (ie vehicle and load) can bear an empty vehicle of any weight normally permitted under the Construction and Use Regulations. The Department will therefore be strongly recommending the use of an "except empty vehicles" plate on all bridges capable of bearing 17 tonnes or more. The legal definition of "empty" would permit the goods vehicle to contain the driver, 2 passengers or crew, fuel, water and essential tools for maintenance but nothing more (see Annex B). Enforcement agencies would be able to observe whether open vehicles were empty or not, but enclosed vehicles will be liable to be stopped and opened to check the point.

Authorisation Procedure

40. It is hoped that the new Traffic Signs Regulations and General Directions will be laid before Parliament and subsequently come into force towards the end of 1991. Until then local highway authorities wishing to sign bridges which have been assessed in accordance with Departmental Standard BD 21/84 will have to continue to apply to the Department for special authorisation for use of appropriate sign designs. The procedure to be followed will be the usual one for seeking authorisation of non-prescribed signs.

41. For the information of local highway authorities the sign face for weak bridges likely to be prescribed in the new Traffic Signs Regulations and General Directions is shown on the drawing attached at Annex C.

42. No final decision has been made with respect to the plate in diagram 627, but it is unlikely to be retained as a prescribed sign. However, it would be available under special authorisation for use in the relatively rare cases where it might be needed.

Other Vehicles

43. The Assessment Code gives details of the loading effects on bridges of fire engines (FE Loading). Highway authorities may wish to

inform fire brigades separately whether specific weak bridge bans apply to them or if an exemption exists for emergency vehicles.

Advance Information of Bridge Restrictions

44. It is important that advance information of bridge restrictions should be given. This should be by means of a sign to diagram 818.2 on the approach to the last alternative route turn-off point before the bridge or, preferably, by a map-type advance direction sign conforming to diagrams 712.1, 719.3A or 729.2 according to the nature of the road. The weight shown should be that for the general limit.

45. The alternative route must be clearly signed not only at the turn-off point but also throughout its entire length by signs to diagram 727 or 728 (showing the destination and the wording "Alternative route for heavy vehicles" or "Alternative route for heavy and track laying vehicles").

46. Guidance on the signing of alternative routes is given in section 5 of Chapter 3 of the Traffic Signs Manual.

Temporary Prohibition of Traffic

47. Where a bridge is closed to traffic, the prohibition should be signed by an "All vehicles prohibited" sign (diagram 617) supplemented by a "No vehicles" plate (diagram 618.1) or an "All motor vehicles prohibited" sign (diagram 619), as appropriate. "Road closed" signs (diagram 565.2) may also be used. If the prohibition is imposed by a section 1 order, barriers may also be erected. The alternative route must be correctly signed throughout its length.

Traffic Regulation Order

48. Restrictions on the use of a public highway by traffic must be legally imposed by an Act of Parliament, Traffic Regulation Order, Regulation, Bye-Law or Notice (See Direction 6 of the Traffic Signs - Regulations and General Directions 1981). A Traffic Regulation Order will normally be used for restricting use of weak bridges. It is

couched in terms of maximum gross vehicle weight for heavy goods vehicles and public service vehicles, and excludes emergency vehicles. An optional exemption for empty vehicles is shown in italics.

Financial and Manpower Implications

49. The cost to local authorities of changes required by the Traffic Signs Regulations and General Directions 1981 is an existing financial burden. Highway authorities have been able to budget for and implement these changes over a 9 year period.

50. Expenditure on re-signing made necessary by the Bridge Assessment Code is eligible for Transport Supplementary Grant, but is to be counted as "minor works" and not as part of the bridges structural maintenance expenditure.

CONCLUSION

51. Please bring this Circular to the attention of the Surveyor or Engineer, the Chief Financial Officer and the Traffic Management and Traffic Signs Sections of your Council, all of whom need to be aware of its contents.

Yours faithfully

F J PARKER
Chief Highway Engineer

ENQUIRIES

Financing of Expenditure: Highways Policy and Local Roads Division, Room S3/10, 2 Marsham Street, London SW1P 3EB (071-276-5441).

Signing: Traffic Policy Signs Branch, Room C10/19A, 2 Marsham Street, London SW1P 3EB (071-276-5349).

General technical enquiries concerning the Departmental Standards and Advice Notes referred to in this Circular: Bridges Engineering Division, Room 3/59, St Christopher House, Southwark Street, London SE1 OTE (071-921-4503).

Programme Co-ordination and Distribution of Circular Roads: Network General And Maintenance Division, NGAM 3e Room 3/11, 2 Monck Street, London SW1P 2BQ (071-276-2730).

Purchase and Distribution of DTp Standards and Advice Notes: DOE/DTp Publications Sales Unit, Building One, Victoria Road, South Ruislip, Middlesex HA4 ON2 (081-841-3425).

ANNEXES

Annex A	Assessment and Strengthening Programmes Co-ordination on Trunk and Local Roads
Annex B	Definition of "Empty Vehicle"
Annex C	Weak Bridge Weight Restriction Sign
Annex D	Model Traffic Regulation Order

HIGHWAY STRUCTURES IN ENGLAND
ASSESSMENT AND STRENGTHENING PROGRAMMES
CO-ORDINATION ON TRUNK AND LOCAL ROADS

Purpose of the paper

A1. This paper provides guidance on a joint approach to carrying out the assessment and strengthening of structures on trunk roads and local roads. It includes structures owned by others, such as BR, BWB and LUL. The advice is intended for local highway authorities and Department of Transport regional offices but may also be relevant in Wales and Scotland.

Background

A2. It was agreed in July 1989 that the UK's present derogation from the European Community maxima for gross vehicles weights and axle weights (40 tonnes and 11.5 tonnes on drive axles) for 5 and 6 axle lorries should end on 31 December 1998.

A3. A 15 year programme for the rehabilitation of the Department's structures was announced in November 1987. The programme includes inter alia, the assessment and strengthening of certain structures to the European weight limits. This element of the programme is scheduled for completion before 1999.

A4. It would be impractical and wrong to restrict the heavier lorries to trunk roads and so local highway authorities have embarked upon a similar assessment and strengthening exercise for structures on their own roads. There is no direct link with the Department's first stage programme (promulgated through BD 34/88 and TRMM 6/88), but local authorities are likely to draw on the published guidance. The local authority programme will be much larger than the Department's and it must take account of many structures owned by British Rail, London Underground Limited and British Waterways Board.

A5. The programmes of assessment and strengthening are major undertakings at a time when the increasing commitment to maintenance and improvement of in-service highways demands a high degree of co-ordination if traffic congestion is to be minimized and the best interests of the public are to be seen to be protected. This work is all to be carried out by a limited number of bridge specialists in the country as a whole.

A6. The extent and nature of the assessment and strengthening programme will demand a substantial resource input from experienced specialist structural engineers. There will be an ongoing requirement for these skills at a time when the industry is demanding structural designers for a wider range of work. It will be essential for the local highway authorities and the Department to forecast the likely level of assessment and design skills required. Every effort must be made to ensure the required skills are available and deployed to best effect, especially the knowledge and expertise of experienced engineers within the highway authorities.

Responsibilities

A7. This paper does not seek to address the precise responsibilities of highway authorities in relation to structures owned by bodies such as BR or BWB; it seeks only to set out a framework within which local authorities and the Department can best co-ordinate the assessment and strengthening of those structures for which they each have recognised responsibilities.

A8. The Department has identified a first stage programme to assess and, where necessary, strengthen many of its older structures; the programme was promulgated through BD 34/88 and TRMM 6/88. In due course technical advice and programming instructions will be published related to:-

(a) Stage 2 - The assessment and strengthening of pre-1975 concrete bridge decks not included in Stage 1.

The programme will be designed to ensure that shear capacity will meet the enhanced standards published in 1973.

(b) Stage 3 - The assessment and strengthening of long span bridges based on updated loading criteria.

A9. Local highway authorities are also required to ensure that their own roads will be ready to receive the 40 tonne lorries by 1999. Where required strengthening has not been carried out by 1999, interim arrangements such as weight or width restrictions and temporary structures will need to be considered. Local highway authorities may elect to draw on the guidance published by the Department but it is for them to determine their own proposals to ensure that their roads can receive the heavier lorries.

Liaison Mechanism

A10. The focal point for the assessment and strengthening programme will normally be the local authority acting both as highway authority in its own right and, in most cases, as agent for the Department of Transport. Some local highway authorities will act only as highway authority for their own bridges. The Department may in some instances be employing consultants directly to manage a part of its programme.

A11. It is clear that neither the Department alone nor local authorities alone can ensure a fully co-ordinated programme designed to minimize disruption to traffic in general and commercial traffic in particular. The preferred option is to secure the necessary degree of co-ordination by creating liaision arrangements between bridge managers in a region including Department of Transport regional offices, local highway authorities and other bridge owners but without producing complicated and unnecessarily burdensome arrangements.

A12. Either within existing or new liaison arrangements it will be necessary to agree and monitor the co-ordinated programmes on assessments, interim measures and strengthening along the following lines.

A13. It is recommended that within the liaison arrangements, local authorities should continue to develop programmes of assessment and possible strengthening on the primary route network and other roads of more than local importance and where the LA acts as a maintenance agent for the Department they should include trunk roads including motorways. In addition it will be necessary for local authorities to reconcile priorities within these programmes with other important work on purely local road structures. The programmes and priorities would then be considered together with programmes for trunk road structures, prepared by consultants (if any) employed by the Department. It would then be a matter for agreement at liaison meetings as to which highway authority was best placed to take responsibility for liaising with highway authorities outside the region.

A14. It is important that all local highway authorities should have an opportunity to be represented at discussions about strategic planning. Individual authorities might not on their own be well placed to decide which if any of its structures would, if restricted or closed during strengthening, result in traffic disruption outside the authority's area; such cases must then be considered either between local authorities or at regional level. However the responsibility for identifying the need for wider co-ordination must always rest with the authority in whose area a structure lies.

Programming

A15. Programmes need to be drawn up to ensure that the structures necessary to maintain HGV movements will have been assessed and, where necessary, strengthened by 1999. At the same time this work needs to be organised so as to minimize disruption to traffic while

it is carried out. With so many structures involved, failure to co-ordinate such work on trunk and local authority structures would almost certainly result in cases of weight or width restrictions being placed at key points on main routes and perhaps simultaneously on diversion routes, resulting in either unnecessary or unreasonably long diversions or at worst even closing-off some parts of the country to HGVs.

A16. The three main activities to be considered are 'Assessments', 'Interim Measures' (ie action taken between the completion of the assessment on an under-strength structure and the strengthening works) and "Strengthening" itself.

(a) **Assessments**

The Department's Stage 1 programme is well underway and has by now included the most vulnerable structures, particularly as its existing programme of Principal Inspections should have resulted in structures being maintained in a reasonable condition. Local authorities will probably wish to ensure that their own assessment programme deals first with structures on key routes, especially those contiguous with trunk roads where assessments are in progress or planned. Ideally assessments should be tackled on a route by route basis, with priority given to the most heavily trafficked HGV routes. Exceptions may be necessary where seriously weak structures are identified on lower priority routes.

(b) **Interim measures**

When an assessment shows a structure to be below the strength required it is up to the assessing engineer to advise on the need for further analysis, a weight or width restriction, or other temporary action such as propping or the installation of a temporary structure. It may in some cases be possible to carry out temporary action as quickly as a restriction can be imposed.

Clearly, careful and soundly based decisions will be called for in order to protect the public safety without imposing unnecessary restrictions on the network.

(c) **Strengthening**

Where the need for strengthening has been identified it will be necessary to ensure that the work can be carried out expeditiously, tackling structures on key routes first, whether they are on local or trunk roads. Consideration should always be given to interim measures which would permit structures to remain unrestricted while permanent works are designed and programmed.

A17. The timing of major strengthening works will need to be decided in conjunction with other maintenance work on the network to minimize disruption and delay. Existing maintenance work inevitably causes disruption and any unco-ordinated structure strengthening schemes, if permitted, would add to the problem. The strengthening of structures will also need to be co-ordinated with the motorway widening programme as announced in the White Paper 'Roads for Prosperity'.

Conclusion

A18. This note addresses the general issues arising from the assessment and strengthening programme and outlines the basic strategy for its execution. It is inevitable because of the very nature of the programme that the way forward will require a flexible approach depending on local circumstances and regular monitoring and review will be necessary to check and record progress.

A19. It is proposed that as a first step the local authority associations, other bridge owners and the Department should arrange regional seminars on the various implications of the assessment and strengthening programme. The intention is to impress upon all highway authorities and bridge owners the need to develop an overall strategy to safegaurd the public interest and to provide an opportunity to discuss the wider issues involved.

A20. Liaison and where necessary co-ordination of local and regional programmes will be crucial to minimize traffic disruption and provide a means of monitoring progress towards the objectives of ensuring that the network remains adequate for the needs of existing and future HGV traffic.

A21. The various regional liaison groups will report to the local authority associations and DTp headquarters. These reports can be considered by the Standing Committee on Highway Maintenance (SCHM).

ANNEX B

DEFINITION OF "EMPTY VEHICLE"

A vehicle is empty if its load consists of no more than -

(a) in the case of a goods vehicle, the driver and two passengers

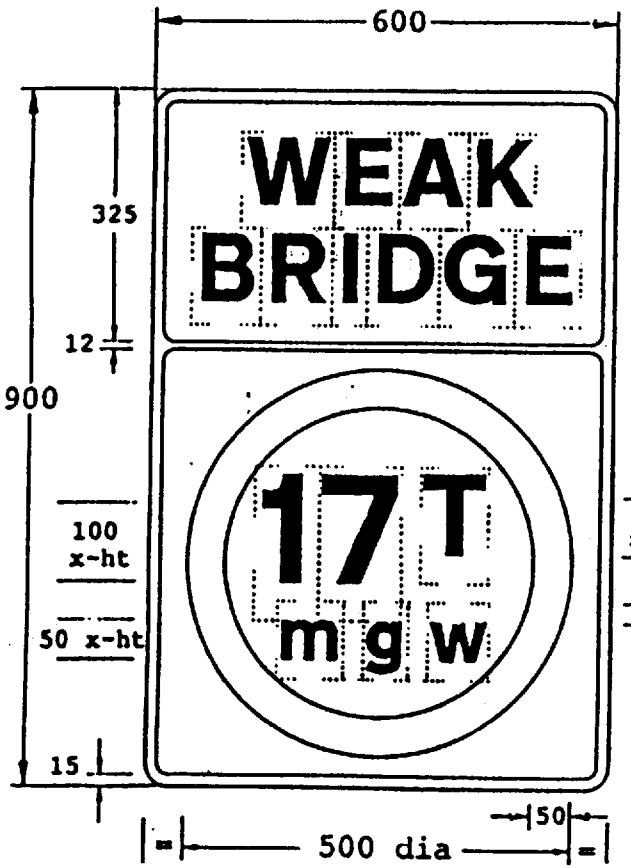
or (b) in the case of a passenger vehicle, the driver and (if any) the crew,

and in either case, fuel and water and other liquids necessary for the propulsion of the vehicle, and loose tools forming part of the normal equipment of the vehicle.

In this definition the expressions "goods vehicle" and "passenger vehicle" have the same meaning as in the Road Vehicles (Construction and Use) Regulations 1986.

Drwg.No.
WBM 626.2
WBM 627.1

WBM 626.2



WBM 627.1

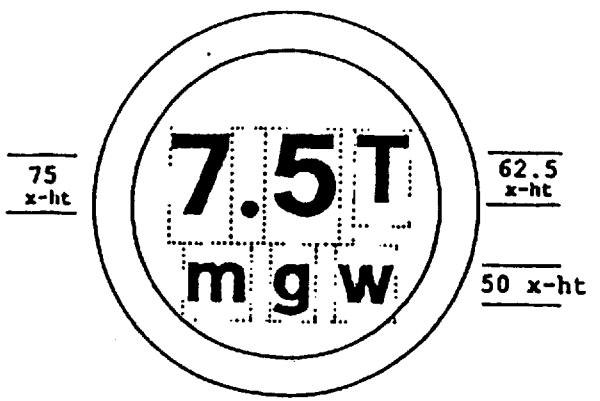
1. The legends are from the Transport Heavy alphabet at the x-heights shown.
2. The x-heights used for the tonnage variations are shown on the Table also examples with the different tile spacing.
3. Colours:- BS.873:Part 6 (Black & White- Table 5; Other colours- Clause 4.3.3.)

   Borders and Legends-------- Black
   Background of upper section, inside of roundel & 627.1 - White
   Background of lower section- Grey
   Roundel border----- Red

4. Plate 627.1 is used with 626.2 when the weight on that sign is 17T, 25T or 33T.
5. Illumination: This must accord with Regulations 15-19 in the current Traffic Signs Regulations and General Directions. as they apply to 626.1
6. The outlines of the tiles do not form part of the sign.
7. The sign shall comply with the current edition of BS.873.

Tonnage variants with x-heights used

100 x-ht	75 x-ht
3T	7.5T
10T	25T
13T	33T
17T	



Tonnage variant

Before using this drawing, confirm with

ANNEX C

SCALE: 1:5 (A3)	
REVISIONS	
Title: Regulatory Sign	
WEAK BRIDGE weight restriction	
Drn: S.P.	date: 15.12.88
Appd: C.B.C.	date: 20.2.89
Issue: February 1989	
DEPARTMENT OF TRANSPORT	
Drwg.No	WBM 626.2

MODEL TRAFFIC REGULATION ORDER TO RESTRICT VEHICLES USING WEAK BRIDGES

The A ....County Council, in exercise of their powers under section 1 of the Road Traffic Regulation Act 1984(a) and all other powers enabling them in that behalf, and after consultation with the chief officer of police in accordance with Part III of Schedule 9 to that Act, hereby make the following Order:-

1. This order may be cited as the District of A..... (B.... Bridge) Weight Restriction Order 19... and shall come into force on .....

2. No vehicle, the maximum gross weight of which exceeds .... tonnes shall use so much of C.... Street in the District of .... as is carried by the bridge over the River B.....

3. Article 2 of this Order shall not apply to -

(a) an empty vehicle, or

(b) any vehicle on an occasion when it is being used for fire brigade, ambulance or police purposes, if the observance of that article would be likely to hinder the use of the vehicle for the purpose for which it is being used on that occasion.

4. In this Order -

"maximum gross weight" -

(a) in relation to a vehicle not drawing a trailer, means the maximum gross weight as defined in regulation 3(2) of the Road Vehicles (Construction and Use) Regulations 1986(b); and

(b) in relation to a vehicle drawing one or more trailers, the total weight obtained by taking the maximum gross weight (as so defined) of each vehicle in the combination and adding them together.

(a) 1984 c.27.
(b) S.I. 1986/1078.

5. (1) In this Order, a reference to an empty vehicle shall be construed as a reference to -

(a) a motor vehicle not drawing a trailer or otherwise forming part of a combination of vehicles; or

(b) a combination of vehicles comprising one motor vehicle drawing one or more trailers,

in relation to which the conditions specified in paragraph (2) of this article are satisfied.

(2) The conditions are -

(a) that the motor vehicle is a motor car, a heavy motor car, or a motor tractor;

(b) that no goods or burden are being carried in the the motor vehicle or, if the motor vehicle is drawing one or more trailers, in that combination of vehicles; and

(c) that not more than 2 persons (excluding the driver) are being carried in the motor vehicle or, if the motor vehicle is drawing one or more trailers, in that combination of vehicles.

(3) For the purposes of this article -

(a) in a case where a motor vehicle is so constructed that it is fitted with a crane, dynamo, plant or any other special appliance or apparatus which is a permanent or essentially permanent fixture, the appliance or apparatus is not to be deemed to constitute goods or burden of any description, and

(b) water, fuel or accumulators used for the purpose of the supply of power for the propulsion of the vehicle or, as the case may be, of any vehicle by which the trailer is drawn, and loose tools and loose equipment are not to be deemed to constitute goods or burden of any description.

NOTE: in the case of an order that is a temporary order, the preamble should refer to section 14 of the 1984 Act, rather than to section 1.