

Date: 04/08/03

Ref: 45/1/209

Note: The following letter was issued by our former department, the Office of the Deputy Prime Minister (ODPM). ODPM became Communities and Local Government on 5 May 2006 - all references in the text to ODPM now refer to Communities and Local Government.

Building Act 1984 - Section 16(10)(a)

Determination of compliance with Requirement A1 (Structure - Loading) of the Building Regulations 2000 (as amended) in respect of a steel beam forming part of building work to create an opening in the main internal loadbearing wall on the ground floor of a two storey house

The proposed work

4. The building work to which this determination relates is a material alteration and comprises the removal of a 3.35m dividing and load bearing wall between the front living room and rear dining room of a two storey (plus basement) terrace house having a plan area of approximately 5.5m in frontage and an overall depth of 13m. The proposed building work will involve the installation of a steel UB beam inserted into the party wall at one end and bolted to a vertical 90 x 90 shs steel post at the other end.

5. Your original proposals were the subject of a full plans application and incorporated the use of a 203 x 102 UB beam. This application was rejected by the Borough Council on the grounds that because inadequate lateral restraint was being provided to the top flange of the beam, this size of beam would fail in bending.

6. In the Borough Council's view this restraint could be provided by locating and fixing the beam tightly underneath the floor joists. However, your clients wish to retain the existing cornice which in turn means that the top flange would not be directly located below the joists and would not therefore have any effective lateral restraint afforded by the floor. However, although you believe that your proposals do provide sufficient lateral restraint, you consider that your offer to substitute a 254 x 102 UB beam would meet the Council's concerns. You also contend that by complying with *BS 449: Part 2: 1969 (Specification for the use of structural steel in building. Part 2. 1969 Metric units - as amended by amendment No 8)* your proposals will meet Requirement A1 of the Building Regulations. It is therefore in respect of the question regarding the use of BS 449 as an acceptable means of complying with Requirement A1, together with the effectiveness of the available lateral restraint to the top flange of the beam, that you applied to the Secretary of State for a determination in relation to the building work.

The applicant's case

7. You have explained the reason for locating the new beam remote from the underside of the floor joists - joists which would otherwise provide the lateral restraint to the top flange of the beam. Nonetheless, you consider that adequate frictional restraint can be provided at the steel/masonry interface and that the restraint afforded by the timber floor can thereby be generated. Moreover, you have argued that in this particular case the self correcting mechanism of a beam will apply rather than restraint being provided by friction. You have enclosed a copy of your letter on this subject published in the 21 October 1997 edition of "*The Structural Engineer*".

8. With regard to your reliance on BS 449 for demonstrating compliance with the Part A requirements, you argue that this is acceptable as this Code of Practice is still an extant guidance document referenced in Section 4 of the current *Approved Document 'A' (Structure)*. In addition you argue that whilst it is clearly safe to design beams as unrestrained, it is not economic and is wasteful of materials and energy.

The Borough Council's case

9. The Borough Council contends that the proposed work will render the top flange of the steel beam effectively unrestrained throughout its length and that this condition should have been accounted for in your initial design calculations for the beam.

10. With regard to the available guidance on the design of steel members the Borough Council considers that members designed in accordance with the recommendations given in BS 449 will only be acceptable where it can be demonstrated that the same members can be verified in accordance with rules given in *BS 5950 (Structural use of steelwork in buildings)*.

The Secretary of State's consideration

11. The Secretary of State takes the view that had the design of the building work not been constrained by your clients' wish to retain the Victorian cornice, then the lateral restraint to the top flange of the beam could have readily been provided by the timber floor. Beams positioned a short distance below the timber floor joists are usually afforded sufficient restraint by the provision of a timber packer piece, or similar, positioned between the steel beam and the underside of the floor joists complete with all necessary mechanical fixings. A typical illustration of this is given in the extract of the SCI publication attached to the Borough Council's facsimile message to yourself. Your plans make no such provision.

12. In this case the Secretary of State acknowledges that the construction method is likely to result in the top flange of the beam bearing against a very irregular face of masonry capable of providing minimal lateral restraint. Moreover, in this regard he considers that reliance on the self-correcting mechanism to which you refer in your published letter of 21 October 1997 could lead to instability.

13. Regarding the second issue concerning the use of BS 449: Part 2:1969 for demonstrating compliance with Requirement A1, the Secretary of State acknowledges that there has been an extensive coexistence period of the Code with its successor Code BS 5950. However, this was especially requested by a majority of commentators who responded to the BSI public enquiry on the proposed withdrawal of BS 449 several years ago.

14. Whilst respecting the Borough Council's desire to be cautious, the Secretary of State considers that the rules given in the BS 449 Code provide for safe construction and he does not foresee any necessity to verify such designs against the rules given in BS 5950. In this regard the Secretary of State is aware of the substantial review of the Code which preceded the publication of Amendment No. 8 of the Code in 1989. The Code is accordingly cited in Section 4 (paragraph 4.6) of the current Approved Document 'A' as suitable guidance for meeting compliance with the Part A1 requirement.

15. Given the Secretary of State's view that use of the current edition of BS 449 is acceptable, it follows that it is his view that achievement of compliance of your plans is dependent on the issue concerning the effectiveness of the lateral restraint afforded by the timber floor construction.

The determination

16. The Secretary of State has given careful consideration to the particular circumstances of this case and to the arguments presented by both parties.

17. As indicated above, the Secretary of State considers that your proposals as submitted make inadequate provision for lateral restraint to the top flange of the proposed beam 203 x 102 UB. He has therefore concluded and hereby determines that your proposals do not comply with Requirement A1 (Structure - Loading) of Schedule 1 to the Building Regulations 2000 (as amended).