Erratum

Discussion on paper published in Magazine of Concrete Research, 2000, 52, No. 4, 275–285

Effect of compression reinforcement on the shear strength of reinforced concrete bridge beams

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Further to the publication of this discussion (in *Magazine of Concrete Research*, 53(6), 429–431), the inclusion of the authors reply should be made.

Reply by the authors

Dr Braestrup is to be thanked for his discussion contribution of our paper and for the valuable comments he has made, both in terms of lower- and upper-bound solutions. Such thoughts add greatly to existing expertise in this field.

We were happy to discover that the effectiveness factor which Dr Braestrup assumes in his discussion turns out to be similar to that provided in the original paper, itself based on a general empirical formula for the most relevant situations in concrete bridge assessment. This fits in well with our intention that the original paper be used by bridge assessing engineers to provide a quick, realistic and accurate shear strength assessment of their bridges.

This is why we decided to concentrate our efforts on a straight line of discontinuity, rather than, as Dr Braestrup quite rightly points out, the more accurate curved line. Dr Ibell's experience in this field has led him to believe that the difference in accuracy between using a straight and a curved line of discontinuity is usually marginal and therefore not worth the additional effort and complication, particularly when put in the context of the necessity for a quick, reliable approach.

The authors regret any possible confusion surrounding the definition of load. All data in tables and graphs was intended to refer to the total load acting on the beam.

The centre of rotation was not taken near infinity due to the possibility that buckling of the compression steel might be an issue. Such a calculation would have shown whether or not the compression steel affected the collapse load. This was indeed achieved and fitted in well with the observation of a slightly altered shear mechanism involving spalling of the concrete near the upper surface, as shown in Figure 11 of the original paper, which shows some rotation and signs of compression failure.

Dr Braestrup's rigorous upper- and lower-bound calculations predict no yielding of the longitudinal steel and this is used to justify why it is impossible for the compression reinforcement to contribute to the shear strength. However, in reality, the addition of compression reinforcement did indeed increase the shear capacity when stirrups were present, and did not when no shear reinforcement was used. It is particularly useful for Dr Braestrup to propose explanations of why this might be possible, much the same as we originally attempted. It could well be that the only reason is due to additional confinement provided by the longitudinal steel. Either way, the findings of the original paper remain that through experimental observation, the presence of compression reinforcement is unimportant when stirrups are not present, but enhance the capacity when shear reinforcement is indeed added. It may be that the best manner in which to include such enhancement is by considering the concrete to be more effective. This is quite possible and our gratitude extends to Dr Braestrup for his thorough approach to this and other questions posed in the original paper.

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