Bridge dynamics and dynamic amplification factors — a review of analytical and experimental findings: Reply

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The authors wish to thank M. Green for his interest in their paper. His discussion was interesting and stimulating. The authors agree with M. Green's comments on the goals of dynamic testing in the future. As was mentioned in the review, most dynamic testing programs so far have been concerned with the evaluation of overall dynamic properties based on flexural response. However, recent research reports indicate an interest in measuring local dynamic amplifications due to wheel loads. Various methods are used and both the roadway (slab) and test vehicles are instrumented. Beside yielding local values of the dynamic amplification factor, the knowledge of the excitation force enables the researcher to compute true frequency response functions. As was mentioned in the paper, these functions can lead to a better definition of vibration frequencies, mode shapes, and modal damping, which are usually obtained with a direct input force mechanism.

The authors are currently conducting a research project at Université de Sherbrooke, in collaboration with the Quebec Ministry of Transportation, aiming at the proposal of standard procedures for dynamic testing of highway bridges in Quebec. The project involves the experimental evaluation of the dynamic amplification factor and dynamic properties of several highway bridges in the province of Quebec. The experimental findings of these tests have been published and include discussions on testing procedures and data analysis techniques (Paultre et al. 1992a, 1992b). Other tests are planned where dynamic wheel loading will be measured on the bridge deck and the vehicle will be instrumented with transmitting accelerometers and strain gauges.

The authors also agree with M. Green on the importance of evaluating dynamic amplification factors in terms of cyclic loading leading to fatigue problems in steel bridges. Several methods for computing the dynamic amplification factor using experimental data were presented in the review, including one based on response ranges. As M. Green mentioned, other approaches, based on statistical analysis of these ranges, are also being considered.

During their experimental investigations, the authors have observed large variations of the response without a consider-