

Foreword

In the four years since the senior author published his first book on Vehicle-Bridge Interaction Dynamics (World Scientific 2004), interest in this subject has spread over the whole globe, especially in Taiwan and Mainland China on the planning, design and construction of high speed railways. Since the completion of the high speed railways in Taiwan in 2007, our theoretical and our practical knowledge of the subject have expanded rapidly. The senior author with his many students has contributed fruitful ideas and computational techniques to advance the field.

The first book was focused on super structure vibration involving vehicle-bridge resonance caused by the moving trains at high speeds. This book deals exclusively with the theoretical principles and numerical techniques on infra-structural vibrations caused by the wave propagation of the ground and the vibration of buildings located along side the railways.

Here, as in every other field of engineering, the first theoretical principles are developed on the basis of a highly idealized condition with radical simplification of material model for soils and structures. Hence it is advisable and realistic that the authors began their new book exclusively with the theoretical treatment of the problem separated from practical applications. The magnitude of the difference between the performances predicted on the basis of the theory can only be ascertained by field experience. Under certain conditions and restrictions, some of the theories have stood the test of experience which is applicable to the approximate solution of practical problems.

It is a great pleasure to commend to you, the reader, this remarkably comprehensive book combining fundamental theory and numerical techniques on wave propagation and train-induced vibrations. The authors have brought together in a unified manner for the first time so much of what until now was available in journal papers authored mostly by the senior author and his former students which are known only to a few in the field. Students, researchers and practitioner will all benefit much from reading this book and having it for reference in the years to come.

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