

Session Report CLOSURE STATEMENT SPECIAL THEME SESSION SD

Joseph Penzien¹

Professor Emeritus, Department of Civil Engineering, University of California, Berkeley; Board Chiarman, Eastern International Engineers, Inc., Lafayette, California, U. S. A.

It is clear from the papers presented in this session that dynamic soil-structure interaction (SSI) effects should be considered when designing important structures such as buildings, dams, bridges, and nuclear power plant containment structures to be constructed in regions of moderate to high seismicity.

These SSI effects vary greatly depending upon the dynamic characteristics of the complete structure/foundation/soil system and the nature of the free-field seismic ground motions produced at the site. Thus, it is important that the analytical modelling of such systems be realistic and that the design free-field ground motions properly represent maximum credible earthquake conditions. Our ability to predict these effects has greatly improved through the development of (1) more realistic modelling of the complete structure/foundation/soil system, (2) improved analysis procedures, and (3) better predictions of the nature of the expected three-dimensional free-field ground motions. While the trend has been toward more sophisticated modelling and analysis procedures, it is significant to note that very simple procedures can often be very effective in assessing SSI effects. I encourage their use in getting preliminary estimates of such effects for design purposes. The much more sophisticated procedures should be used however for those cases involving large/heavy critical systems.

As shown by many papers in this session, the results of field tests on various types of structures under forced vibration and earthquake conditions have already provided an invaluable data base for correlation studies which allow us to verify the validity of various procedures used in assessing SSI effects. As we continue to improve our understanding of SSI effects and how to treat them, further field tests will be needed.

The authors of the papers presented in this session deserve much credit for their valuable contributions to our understanding of dynamic soil-structure interaction and our ability to properly reflect such behavior in seismic resistant designs. Speaking on behalf of the earthquake engineering community, I extend sincere thanks and appreciation to each one of them.