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Post-Event Data Analysis and Report

After a significant event, such as an earthquake, strong winds, or nearby construction activity, building owners and engineering consultants are often interested in knowing how their instrumented structure behaved.

Having the raw event data is certainly foremost. However, computing important engineering response quantities and comprehensive building responses from raw data is another thing altogether. Today, most professional engineers simply do not have the time or the necessary tools to process and analyze event data in a timely fashion – especially after a large event affecting many structures.

To meet this need, Kinemetrics Open Systems and Services (OSS) Group is pleased to offer a service for *Post-Event Data Analysis and Report*. This service is performed by an experienced Licensed Professional Engineer with a Ph.D. in Structural Engineering. The report deliverable is designed for engineers familiar with the building but they are concisely written and can be easily understood by all stakeholders, regardless of background.

Typical analyses performed include:

▪ **Preliminary File Processing:**   *Inspection of event data files for correctness and completeness; file format conversion*

▪ **Preliminary Data Processing:**   *Inspection for quality of data; signal processing such as baseline correction; band-pass filtering, timing correction (if required)*

▪ **Initial Data Analyses**:   *Calculation of peak measured amplitudes; estimate peak response amplitudes for complete structural geometry*

▪ **Standard Data Analyses:**   *Perform numerical integration to obtain structural velocities, displacements and interstory drifts; comparison of estimated responses to standard published performance limits; compute base response spectral accelerations, comparison of response spectral accelerations to mapped design values (per current design codes such as IBC 2012)*

▪ **Advanced Data Analyses:**   *Perform system identification to estimate structural dynamic properties such as natural frequencies, damping ratios, and mode shapes (pending quality of data), update database and evaluation of trends based on previous response data analyses performed (if available)*
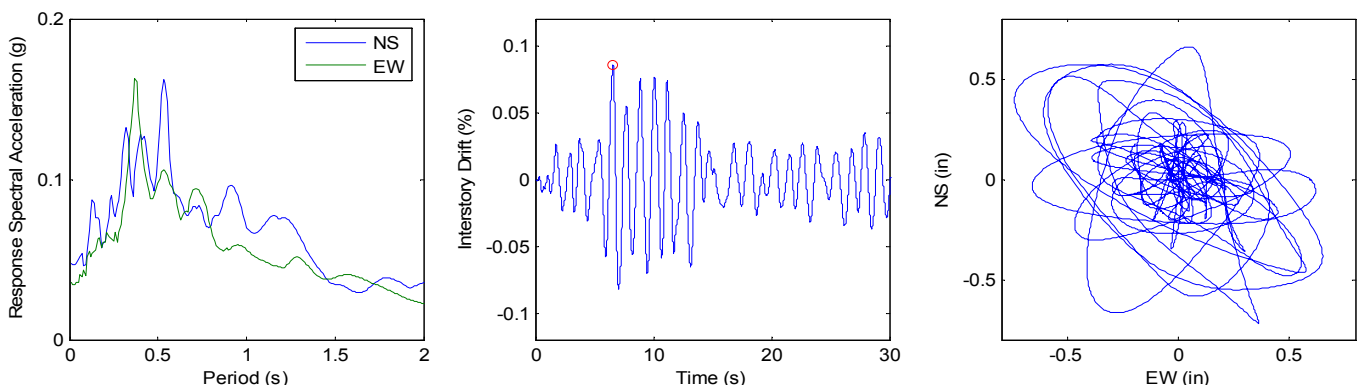
Example Report Figures; response spectra (left), interstory drift (middle), and XY roof particle motion (right)