MFS_Strong Motion Databank and Database (Universidad Politécnica de Madrid)

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INTRODUCTION

The Iberian Peninsula is a region of moderate seismicity, where most of the accelerograms recorded until now correspond to earthquakes of low magnitude. These records are not enough to assess seismic hazard directly according to the instrumental parameters or to estimate especific response spectra for sites in the area. The possibility of access to strong ground motion recorded in other zones is specially interesting and provides a way out to this problem.

Extrapolation of the knowledge (source effects, attenuations, and local amplifications) obtained from accelerograms recorded in regions of similar characteristics to the region studied, could be carried out, whithin the adequate margins of uncertainty.

For these reasons a research project has been developed, the DAÑOS project, financed by the Spanish Nuclear Safety Council and the National Enterprise for Radioactive Waste Disposal. The project is aimed at the characterization of ground motions in the Iberian Peninsula's sites and one of the main activities has been the design of a strong motion databank, called MFS, by compiling and classifying accelerograms and spectra from all over the world. (Benito et al., 1998; Cabañas et al., 1999)

DATA BANK STRUCTURE

A schematic representation of the data bank design is shown in figure 1. The adopted design makes it easier both the selection of the records and the parameters for their analysis and treatment, and subsequent applications in the Earthquake Engineering field.

The design model adopted by the storing and proceesing of data include three different parts:

- The so-called *Data Bank*, composed by an extensive collection of accelerograms and spectra from all over the world.
- The associated *Data Base*, including seismological characteristics of data.
- The Informatic Utilities, with the software for the explotation and proceesing of data.



Figure 1. Structure of MFS Data Bank.

Informatic Utilities

Different programs and macros (SAC-LLNL) have been developed for the analysis of data and their treatment, and two main programs have been designed for the selection and data processing: *MFS Daños* and *ITA Daños*.

MFS Daños. It is an interface program of MFS Data Base, aimed at facilitating queries and handling of these data to any user. The program allows to make general queries, involving all the tables and data, or other more specific questions by the selection of different parameters or interval values through the logic combination desired. One of its outputs is shown in figure 2.

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Figure 2. Output sample of MFS-Daños interface program.

ITADaños. It is an interface for processing strong motion records which allows reading and conversion between different formats, accelerograms correction, spectra estimation and representation of different graphics output, with the possibility of conecting to other programs (for instance Excel-Microsoft). This inteface links to BAP software (Basic Accelerogram Processing) developed at USGS (converse 1995) for processing records. The main menu of the program is shown in figure 3.



Figure 3. Main menu of the ITA-Daños program.

COMPOSITION OF DATA BANK

To date, the MFS Databank has stored more than 15,000 strong ground motion recorded components, corresponding to 1,400 events. Related information to these records is still being updated in the associated Database. A quick look at the stored data and their geographical distribution can be seen in figure 4, where earthquakes and records percentages of each region are shown.



Figure 4.- Geographical distribution of data contained in the MFS-Databank.

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