

Abstract of EMF RAPID Engineering Project #5 **Development of an EMF Measurements Database**

The primary goals for this project were (1) to develop a database structure that could accommodate the diversity of EMF data sets, (2) to provide guidance for production of future EMF data sets, and (3) to serve as an accessible repository of EMF measurement data.

Specific objectives of the EMF Measurement Database were to preserve study descriptions, results and data; to provide readily accessible, well-documented data; and to facilitate communication among researchers. In addition, the EMF Measurement Database was to encourage additional analysis of existing data sets, facilitate analysis of data from multiple projects, support design of new studies, and permit future issues in EMF exposure assessment to be addressed with existing data.

The investigators developed specifications for the various elements of the database. Each data set in the database was formally described by a metadata file that covered the following: origin, development, logical and physical structure, and distribution mechanism for the data.

Most of the data products in the possession of the EMF Measurement Database are available for download from an Internet site (<http://www.emf-data.org>). The site consists of numerous HTML documents describing the various features of the database, as well as providing the metadata for available data sets. It provides descriptive information in a home page, access to data products with a file transfer protocol (ftp) address, and links to other EMF-related sites.

Researchers contributing data sets are encouraged to submit reports consisting of text, tabular, and graphic information describing their study and analysis of facts. Guidelines have been developed for preparation of reports. The researcher may prepare his/her own metadata, using a software package provided by the maintainers of the database, or may submit the existing data and the database maintainers will organize the metadata.

It is important to note that the Web site exists as a clearinghouse only. Reports are not validated by the service. Data products and related materials are available for use under a liberal user license that allows modification and redistribution.

Study limitations

- The inventory of data sets available through the Database is still quite small. Addition of new data sets can be time-consuming.
- No reports have yet been submitted by contributors.
- The problem of presenting inherently complex information in a simple way has not been solved.

Areas for future research

Additional data sets will be integrated into the Database. Improvements to the presentation of metadata will continue.

EMF RAPID Engineering Project #5

Development of an EMF Measurement Database

Purpose and Focus

The primary goals for this project were as follows:

- (1) to develop a database structure that could accommodate the diversity of EMF data sets,
- (2) to provide guidance for production of future EMF data sets, and
- (3) to serve as an accessible repository of EMF measurement data.

The EMF measurement data sets currently in existence were compiled with varying goals and techniques. Consequently, they have different information content as well as varying logical and physical structure. Future studies will continue to pursue varying goals and to use techniques that cannot be known in advance.

Specific objectives of the EMF Measurement Database were as follows:

- to preserve study descriptions, results and data;
- to provide readily accessible, well-documented data; and
- to facilitate communication among researchers.

In addition, the EMF Measurement Database was to encourage additional analysis of existing data sets, facilitate analysis of data from multiple projects, support design of new studies, and permit future issues in EMF exposure assessment to be addressed with existing data.

Tasks: Goals and Methods

The investigators used a formal, but open, structure to preserve study descriptions and data. Specifications were developed for the various elements of the database. Each data set in the database was formally described by a metadata file. For each data set, the structured metadata file described the following:

- origin,
- development,
- logical and physical structure, and
- distribution mechanism.

The metadata for each data set was generated according to a specification developed for the EMF Measurement Database.

The actual measurement data were contained in data products for each data set. The number and type of data product vary by data set. Most of the data products in the possession of the EMF Measurement Database are available for download from an Internet site (<http://www.emf-data.org>). The site consists of numerous HTML documents describing the various features of the database, as well as providing the metadata for available data sets. It provides descriptive information in a home page, access to data products with a file transfer protocol (ftp) address (<ftp://www.emf-data.org>), and links to other EMF-related sites. Electronic mail can be sent to the Database at info@emf-data.org. (For some data sets, the data products will be maintained by other parties who may have their own access procedures.) By providing a Web site, the project will achieve a third objective: fostering communication among researchers by providing ready access to data and information about EMF studies.

Researchers contributing data sets are encouraged to submit reports consisting of text, tabular, and graphic information describing their study and analysis of facts. In addition, data-set contributors or users can provide reports that describe results of the study and analysis of the data with text and figures. Guidelines have been developed for preparation of reports. A Data Set Submission Kit includes specifications, the form, and an optional software package to prepare the metadata in the specified Standard General Markup Language (SGML) format. Alternatively, the researcher may submit the existing data and the database maintainers will organize the metadata.

It is important to note that the Web site exists as a clearinghouse only. Reports are not validated by the service. The project report covers issues of Intellectual Property. Data products and related materials are available for use under a liberal user license that allows modification and redistribution.

Current data sets available at the Web site include the following:

001 Personal 24 Hour Emdex Pilot Project: Lynne Gillette and Doreen Hill, EPA, 1992.

This project involved twenty volunteers who wore EMDEX C meters for 24 hours (including a typical work/school day) and logged information about their activities and possible sources of magnetic fields they encountered. Most of the subjects (18) were federal office workers, one was a middle school student, another was a horse stable operator. Magnetic fields in the ELF range were collected at 10 second intervals. Six data products are available for this data set.

002 Household Appliance Magnetic Field Data: James R. Gauger, IIRTI, 1983.

The results of a non-comprehensive survey of the 60-Hz magnetic fields produced by common household appliances and tools are reported. Maximum magnetic field levels as a function of distance for 95 appliances of 27 basic types are characterized. The measurements represent the highest magnetic fields generated by the appliances in any normally accessible direction from them. All sets of measurements but two were made at the fundamental powerline frequency of 60 Hz and all represent narrowband rms levels of magnetic flux density. Measurements at powerline harmonics and other frequencies were not made. The data presented should be useful in understanding the levels of magnetic field produced by household appliances and also in estimating magnetic field exposures in homes and workplaces. One data product is available for this data set.

003 DOT Conventional Vehicle Study: Electric Research and Management, Inc., 1997.

Magnetic fields in and around five vehicles were measured using the MultiWave wave capture device. Measurements were made over 9 road types during 57 sessions. Up to 12 3-axis magnetic field probes were deployed simultaneously at multiple positions within each vehicle. Additionally, external measurements were performed around the perimeter of each vehicle. The purpose of the study was to help characterize the magnetic field environment in conventional transportation environments. The data collected are intended to serve as a baseline against which other existing and emerging transportation technologies, such as electric vehicles, can be compared. Three data products are available for this data set.

Summary

The EMF Measurement Database established by this project provides a readily accessible (via Web site) source for researchers to obtain current information on related research. Researchers may also submit their own work in the form of text, tables, and graphics, for inclusion in the database. Each data set is accompanied by a metadata set that describes the nature of the data available. The metadata may be organized either by the submitter using a software package supplied by the Database maintainers or by the maintainers themselves. The research results submitted by contributors are not validated by the service.