Memorandum

U.S. Department of Transportation

Federal Highway Administration

Washington, D.C. 20590

Subject: Computerization of Construction Records

Date: SEP 21 1989

From: Director, Office of Highway Operations

Reply to Attn. of: HHO-32

To: Regional Federal Highway Administrators
Federal Lands Highway Program Administrator

Over the last few years, there has been a significant increase in the utilization of microcomputers in construction. Technology is presently available which allows measurements and test results to be obtained and recorded electronically. This raises a question concerning the proper method of handling and controlling electronic records on Federal-aid construction projects.

The FHWA has established a Headquarters task force to analyze and define electronic recordkeeping parameters for construction projects which will satisfy Federal statutes and regulations. Basically, computerized project records must be maintained so that the legal and financial interests of the Federal Government are protected. The collection and retention of construction records electronically must be acceptable from an engineering, audit, and legal standpoint. Electronic recordkeeping requirements must satisfy these conditions; however, the requirements for electronic records should be no more stringent than requirements for hard copy records. Any records system should allow for the reconstruction of the chain of events that occurs on a project.

Records, in general, can be admitted as legal evidence if they are considered "trustworthy." To be considered "trustworthy" the records should meet the following requirements:
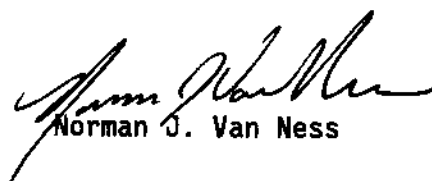
1. Records must be made at or near the time of the event.

2. Records must be made by or from a person with direct knowledge of the event.

3. Records must be kept in the regular course of business.

4. The above requirements must be supported through testimony provided by the custodian of the records or other qualified witnesses.

To meet engineering and fiscal requirements, inspection and test reports should provide sufficient information to determine that the project was built in substantial compliance with the plans and specifications and allow verification of pay quantities. These requirements can be met by using standards developed by the industry or by State proven procedures. The Nebraska Department of Roads is experimenting with electronic recordkeeping on several Federal-aid projects this construction season. Part of this experiment involves a comparison of electronic records versus hard copy records for selected pay items.

At some point in the future, national electronic recordkeeping procedures and standards will no doubt be developed. In the meantime, if a State proposes to initiate electronic recordkeeping for Federal-aid projects, it is suggested that the Division Administrator require the State to also maintain its manual system for some reasonable period of time. This will permit evaluation of the State's proposed electronic recordkeeping procedures to determine if they meet the standards for trustworthiness and protect the financial interest of the Federal Government.

Several issues must be considered in adopting electronic records, including security, accessibility, reliability and storage. How these are addressed will depend a great deal on the type of hardware and software utilized in the recordkeeping system.

Attached are draft guidelines to assist in evaluating State procedures for computerized records. As experience is gained in electronic recordkeeping, we will keep you informed. If other States are using computerized project records or plan to use them, please notify Ray Hurst, HHO-32, FTS 366-1565.

Norman J. Van Ness

Attachment

GUIDELINES FOR EVALUATION OF STATE PROCEDURES ON ELECTRONIC RECORDS

The State's procedures for collection and retention of electronic records should include the following provisions:

SECURITY OF RECORDS

o   Ensure that only authorized personnel have access to input electronic records.

o   Provide for adequate backup and recovery of records to protect against information loss. Protection procedures should be in place to prevent both human errors and system failures.

o   Ensure that appropriate agency personnel are trained to safeguard records.

o   Prevent unauthorized alteration or erasure of electronic records.

o   Provide a method for all authorized users of the system to retrieve desired documents.

RELIABILITY OF RECORDS

o   Maintain a procedure for inputing, editing, and updating all records. This should include adequate documentation of software programs and hardware dependency.

o   Since the content of the information may be changed if the equipment is not working properly, the State may be required to present evidence that the equipment was operating reliably the day the computer record was prepared. A log of computer operations indicating the absence of any malfunction is generally adequate. Tests run on the equipment to show performance should also be logged.

o   Computer errors often result from errors in the initial data entry. Trustworthiness is enhanced through procedures for verifying or proofreading data entered into the system.

o   The reliability of computer records is enhanced if an accurate audit trail is provided to indicate the steps followed in processing the data and the methods used to prevent loss of data.

o   Errors in computer records can result from errors in the computer programs. The State may be required to present evidence related to the development and testing of the programs. Programs are often . examined by expert witnesses to determine their accuracy or reliability.

o   Computer printouts prepared in the ordinary course of business seem to have higher trustworthiness than similar computer printouts prepared for trial.

STORAGE OF RECORDS

o   Maintain on an appropriate storage media throughout their life cycle.

o   Permit easy retrieval of records in a timely fashion.

o   Provide for backup storage of records.

GESPRELR.P79
09/20/89