

MATERIALS & RESEARCH DIVISION

Reviewed By:

Robert F. Cauley *RFC*
Materials & Research
Engineer



Prepared By:

John Carpenter *JAC*
January 25, 1991
Page 1 of 2

RESEARCH UPDATE

Number U91-3

USE OF COMPUTERS IN FIELD OFFICES

REFERENCE: Work Plans Vt 85-02 through Vt 85-02F

HISTORY:

Computerization of project records in the Vermont Agency of Transportation (VAOT) construction field offices began in July 1985 on the Alburg and Burlington projects. (Work Plans Vt 85-02 A through C) Early systems used IBM AT hardware and commercial multiplan (spreadsheet) software entitled Construction Book Keeping System (CBS), developed by C & S Engineering Company.

When used on a construction project, CBS automatically computed the quantities installed to date and provided the Resident Engineer with cumulative quantities. Automatic composite histories of item installations and estimated payments were unavailable. Report formatting relied on the capabilities of the operator. Because of these limitations, project personnel continued to maintain project records using traditional manual methods in addition to the records provided by CBS.

In April 1987, similar hardware (IBM AT) was installed in Burlington (VT 85-02 D) with new software developed by the Arizona Department of Transportation (ADOT) and customized extensively to meet VAOT reporting needs. This necessitated modification to make the ADOT software compatible with VAOT's Construction Management System. (CMS) CMS incorporated a data base format and retained complete histories of item installations and payments. All procedures were menu driven and the operator could select desired routines with a single key stroke. All reports were preformatted and required no operator manipulation. CMS also provided cataloging of all information required for progress and final summary reports. These included daily reports, bi-weekly estimates, estimate item detail, earthwork summary, sign summaries, and material or cost overrun / underrun explanations.

STATUS:

During the 1988 construction season, CMS was used for fourteen additional projects, representing nearly \$40 million in federal-aid construction. Two were experimental. (VT 85-02 E and F) The capability to track distinct portions of a project (a single drainage system for example) was added. This permitted elimination of nearly all manual project records. The resident still must produce graphic records. (Drawings of concrete repair areas for example) Several projects utilized this option with excellent results. Accuracy and quality of the project records and reports improved with much of the mundane, error prone computation and transcription required by manual methods eliminated.

In 1989, eight additional projects, totaling approximately \$12.5 million of federal-aid construction, used CMS.

In 1990 an additional eighteen projects, totaling \$32 million in federal-aid construction, used CMS.

The hardware purchased with experimental project funding remains in use today.

CONCLUSIONS:

Adoption of CMS as the VAOT standard is conditional. Final adoption depends upon developments in the Agency mainframe and Digital Equipment Corporation (DEC) project management system. Automated transmission of financial data directly from the project field office to the mainframe financial system is a long term objective. It may become more cost effective to revise or replace the field CMS programs to facilitate integration with mainframe software.

Regardless of the hardware and software used, these experimental projects proved the feasibility and value of computers in field office record keeping and provided an invaluable foundation upon which to expand this important improvement in record keeping methods.

During the next four years use of computers in field offices will expand to eventually include all projects meeting minimum criteria of adequate duration (minimum 3 months) and dollar value (\$400,000).