

ROOFER PROGRAM ANALYZES BUILT-UP AND SINGLE-PLY INSTALLATIONS

BY DICK PHILLIPS

The U.S. Army developed an engineered management program for maintenance, repair and replacement of built-up and single-ply roofing systems. This computer program, called ROOFER, is a systematic procedure to determine priorities and select maintenance, repair or replacement strategies to ensure maximum value for the roofing investment.

Facility managers in charge of multi-building complexes can be overwhelmed with the size and complexity of their jobs. This systematic approach uses computer technology and "hands-on" methods to set priorities and highlight roofs that need the most attention. Recent expansion of the program to include single-ply membranes now allows analysis for both built-up and single-ply installations.

THE TEAM

The program is designed to allow someone with minimal knowledge of roofing systems and construction to utilize this computer program after brief but thorough training. Training consists of in-house classroom style discussions and examples of on-site procedures. Deciding how to staff the project with regard to manpower and length of time includes considering size, location and time of year. Five people (two teams of two people plus a coordinator/computer operator) recently completed this computer program on 160 buildings in a southern state and completed the field work in about seven weeks.

USE OF TECHNOLOGY

One of the key components to the success of this computer program is the use of nondestructive testing to detect the presence of wet insulation. Available technology to perform this process includes nuclear moisture detection, capacitance method and infrared scan.

Both aerial infrared and roof surface infrared work well when many buildings are concentrated at one site. Implementation of this computer program requires roof core cuts to identify system components, details and moisture content determination. To minimize the number of core cuts required, the infrared work should be done and analyzed before the field work. This also helps to focus on potential trouble areas.

The use of a portable notebook computer at the site significantly enhances efficiency. The field data is entered into the program as it is obtained. This allows the team to further investigate any discrepancies resulting from conflicting data between facility records and data gathered in the field. It also flags any missing data so "the facts" are gathered prior to leaving the site.

The use of computer aided design and drafting (CADD) is an important implementation to ROOFER. CADD provides for each modification of the plans in the event of future additions or rooftop modifications. It also simplifies the storage and retrieval of the roof drawings for large facilities.

COST

If the project includes a large number of buildings, estimate costs at 9 cents per square foot for field work and

from 1 to 3 cents per square foot for infrared. Availability and accuracy of roof historical files have a direct impact on the time involved to complete the project. If no records are available, or are otherwise outdated, the information gathering process is significantly more time consuming.

BENEFITS

The feedback received from the facility managers where ROOFER has been initiated has been very positive and encouraging. Although still relatively new, this computer program has allowed these managers to realize the potential for significantly reduced roof-related expenditures in the future through aggressive maintenance and repair now and, to a greater degree, to avoid the misdirection of generally insufficient roofing funds to unneeded repair/replacement projects.

The managers have found that the time spent dealing with roof-related duties has been greatly reduced. The inventory database provides all the information available for a specific roof with a few key strokes. The most enthusiastic response has been toward the economic evaluations this computer program provides. The decision to reroof or repair is analyzed from an economic viewpoint and the most cost-effective approach is taken. The ability to prioritize repair/replacement projects is also a greatly appreciated aspect of the program and assists in the preparation of budgets and appropriations of funding.

Results indicate that all facilities where this program was implemented were in need of some form of assistance to manage their roofs. The estimated repair/replacement costs for the first year are quite high, indicating major work is required to bring the roofs to a manageable level. Once the initial work is completed, the long-range cost savings can be realized.

PRIVATE USE

A successful roof management program using this computer program was initiated at the University of Minnesota, Duluth Campus. Years of underfunding and management-by-emergency had left the roofs of the facilities vulnerable to water entry. Unplanned roof repairs were eating into the building maintenance budget, with no preventive spending and no clue as to which roof might fail next. Today, the university's roofs are actively managed. The computer program quantifies problems for prioritizing. Repairs are now made by plan, with annual repair cost-prevention included, and the previous budget has been cut in half. Aggressive roof replacement will leave all rooftops in good order and save 1.6 million dollars in repair and replacement costs through 2006.

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