

Roof Asset Management, From the Roof to the Computer

By C. BRUCE COTTON, RRO

A ROOF ASSET MANAGEMENT PROGRAM exists solely to extend the life of the roof by improving the quality of the maintenance. Timely preventive maintenance is the best investment an owner can make.

Roof Asset Management is a systematic, logical approach to roofing issues that some building owners may not fully understand. Having an organized approach that is easy to understand will help put them at ease. Computer software currently available for Roof Asset Management can make this process more efficient.

Initially, education of the owner should take priority. Most owners or building managers have scant knowledge of which roofing systems are in use on their properties or their current conditions. This affects their ability to make sound maintenance and budgetary decisions regarding Roof Asset Management.

The consultant must demonstrate knowledge and expertise in this area in order to assist his clients in committing to a Roof Asset Management program. Reluctant owners should be reminded that an investment of pennies per square foot to establish a Roof Asset Management program will provide a substantial return. Once the client realizes the advantages of a long-term commitment, the true work begins.

Since database programs are the most efficient software programs for the collection and retrieval of information, implementing a Roof Asset Management program begins with selection of a database program. Choosing the correct roof evaluation and management software will help establish what information shall be collected and how it will be entered into the database.

Starting the Evaluation Process

Planning and coordination with the client is essential. It is impossible to have too much communication between consultant and owner when setting up a program. Simple things such as identifying roof sections or buildings can become confusing without preparation and agreement between both parties. In most cases, the actual survey will start with a meeting attended by the owner, maintenance people and other personnel involved in the survey work. The people who deal with the roofs on a regular basis can provide valuable information to the survey team. Failure to coordinate with maintenance personnel

can complicate the survey process. Creating new names for roofing sections and the roof top equipment can create problems with on-site maintenance staff. If all parties are on the same page regarding data collection, it will make the survey process more efficient.

Some information can be gathered from the records of the owner, such as warranties, specifications, contracts for roof replacement and maintenance records. This information can then be entered into the database before the surveys are started and the field team can verify if repair work was actually performed or even if the same roofing material is still on the roof. Knowing if roof systems are protected by warranties will tell the survey team if they should collect core samples or not. Cutting a core in a warranted roof could have serious financial consequences to the owner and the evaluation team.

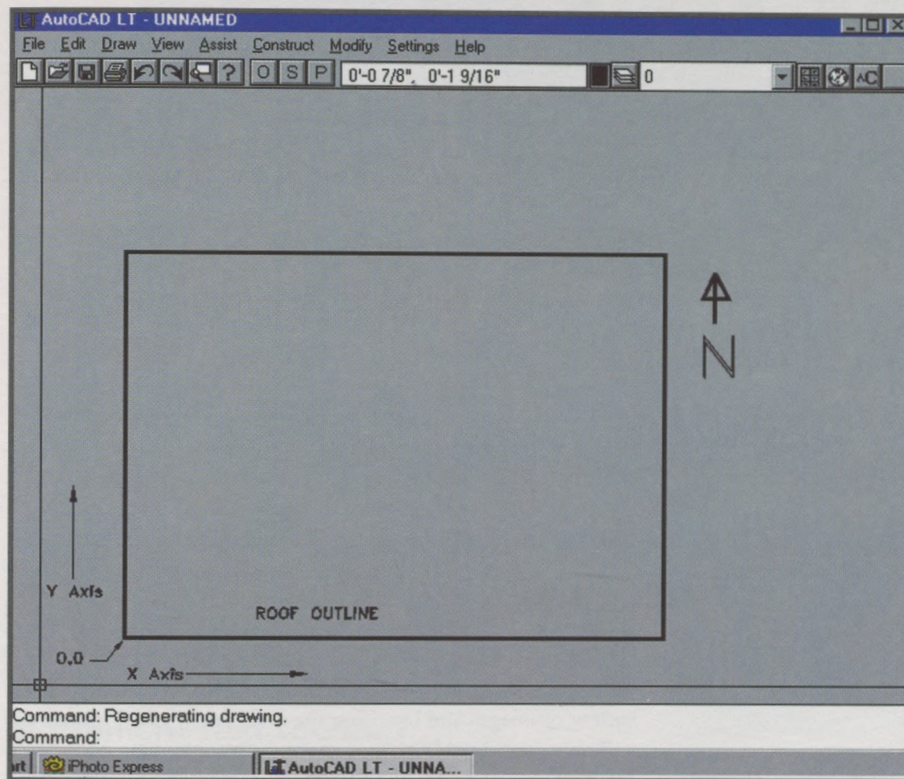
Gathering the information involves evaluation of the existing conditions of the roofing installation by hands-on assessment of each roof section. This should only be accomplished by experienced individuals as the establishment of baseline roof conditions will determine the course of action for the next three to five years.

The CAD Drawing Process

One member of the roof evaluation team should be familiar with the CAD program used to create the roof plans. Knowledge of the operation of the roof management software is also required. Generally, one day should be sufficient to familiarize field personnel with the operation of the software. Use of a laptop computer during the roof evaluation will further streamline the process.

Knowing the basics of the CAD drawing process provides the field survey team with valuable knowledge when sketching and measuring roofs. Thinking of the roof section as a computer screen and knowing how the CAD operator is going to create the drawing will make the entire process—from measuring to creating the drawing—more efficient.

Creating roof plans does not require the use of expensive drafting programs such as Autodesk's AutoCAD[®], which would cost thousands of dollars. There are several CAD software programs available that cost less than a thousand dollars and can create complex drawings. AutoCAD LT[®], available from Autodesk, allows you to create drawings that are compatible with the more advanced versions of AutoCAD.



AutoCad LT

Computer Aided Drawing (CAD) software operates using an X & Y axis. All roof drawings should be started at the 0,0 location on the screen. Normally this is the bottom left corner of the screen. This could also be considered the Southwest corner of the screen. All dimensions of the building start and end at this location. The CAD operator can enter locations and sizes of equipment by simply knowing their X and Y coordinates as long as they are consistent with the 0,0 starting point.

Roof Evaluation Inspections

Two-person teams are the most efficient way to perform roof evaluations. Each team will require this minimum equipment:

- ▼ Two 300' fiberglass tape measures
- ▼ 25' to 30' hand tapes
- ▼ Core cutting devices
- ▼ Repair materials for every type of roof to be cored
- ▼ A camera, either 35 mm or digital
- ▼ Tool bag to carry materials
- ▼ Extension ladder
- ▼ Two-way radios
- ▼ Spray paint (inverted cans)
- ▼ A long rope to assist in getting tools to the roof

The on-site work starts by measuring the perimeter of the roof section and creating a line drawing on paper. After completing the line drawing, determine the location of the X and Y start (0,0) point for measuring the location and size of the roof top equipment. Each roof section should be drawn individually to eliminate possible confusion when the draftsman is

creating the CAD drawings.

After the 0,0 location is determined, the two 300' tapes are laid out perpendicular to each other across the roof surface. One tape starts at the 0 X location and is stretched across the roof. The other tape starts at the 0 Y location and is stretched across the roof. The tape locations should be as close to roof top equipment as possible. The tapes do not have to be in the 0,0 corner, but they must start at the 0 side of each roof edge.

After the tapes are in place, one team member becomes the X coordinate person and the other becomes the Y coordinate person. One person will log the dimension for the location of each piece of roof top equipment. The coordinates are logged onto a columnar form which shows the X and Y locations and the X and Y sizes of each piece of equipment. Each piece of roof top equipment can be measured as the team moves across the roof surface. The importance of keeping the X and Y coordinates in

their respective columns cannot be emphasized too strongly. Transposing an X or Y dimension can move a piece of equipment to the parking lot instead of the roof top. On large roof areas, the two team members can communicate clearly using FM or UHF radios.

Unfortunately, all roof shapes are not squares or rectangles. For roofs having odd angles, arcs or other shapes, the field personnel must sketch the roof outline very accurately and determine the degree of any angles. The 0,0 location should be clearly marked on the drawing. All notes concerning angles or other information concerning the roof shape should be noted on the roof sketch so that all information concerning the drawing will be in one location.

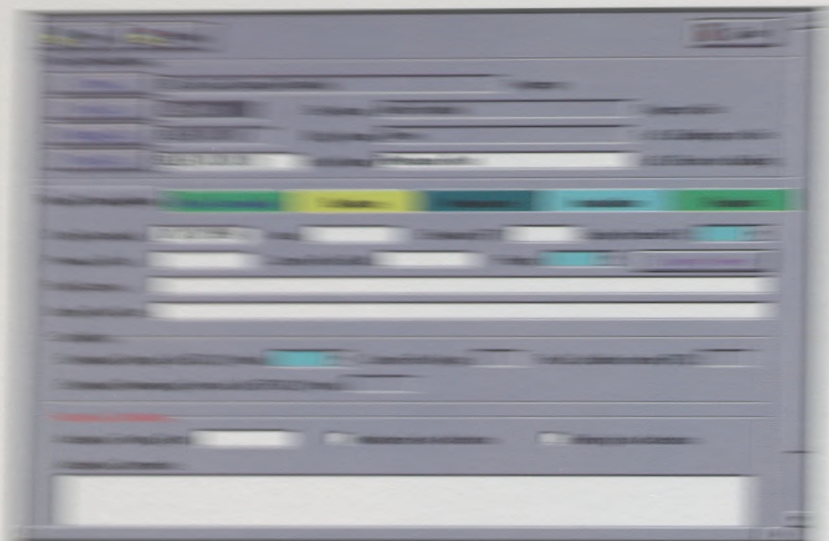
Measuring in this manner enables the survey team to walk over most of the roof area and evaluate the existing conditions. After completion of the measuring, comments concerning the conditions of the roof components can be entered into the database via a laptop computer. Teams not using a laptop computer can note the conditions of the roof components on the equipment location log.

On large, multiple-location projects, taking the laptop computer to each site can save many hours of data entry time. Modems can be used to send the information back to the office where the information can be collated for an entire project.

Roof Evaluation and Management Software

A roof management database should offer flexibility and speed to perform the tasks required.

Single-source entry can save time and space within the data-



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Most roof management software should have the capability to perform with current technology and be able to be upgraded to the newer technology, which is being brought to the marketplace on almost a daily basis.

Most roof management software programs allow the user to have four levels of identification: This may start as the Client, Site Location, Building I.D., and Roof I.D. All Identifiers are linked together like a family, starting with the parent, then the children, then the grandchildren, and finally the great-grandchildren. Referential integrity should link all of the information within the database.

Data entry always starts at the top of the chain.

- A Client must be entered first,
- then a Site for the Client,
- then a Building for the Site,
- then a Roof for the Building.

If the database has forms for the roof top components and equipment, then these items are linked to each roof section.

All types of roofing systems should be able to be evaluated and stored within the database. The large number of different roofing materials can present a challenge to the user in determining which materials may be on any given roof. Being able to store information for every type of roofing material provides the user with a single source of information on all of his roofs.

The more information available to the user within the database, the faster the data entry. Lookup tables (descriptions) can be used for identifying roofing components such as: roof edge, parapet wall, adjoining wall, drains, vent pipes, HVAC equipment, fans, vents, roof top devices and other miscellaneous equipment.

Description tables should be editable so each user can create his own descriptions to meet his needs. If the user is forced to pick a description from a stored table, then all users will use the same description, which will be correctly spelled each time or incorrectly spelled if it is incorrect within the table.

Consistency in descriptions cannot be emphasized enough. This becomes critical after the information has been entered

into the database. If the user enters information into the database, the information will be available to all users who have access to the database.

A database with a good program can be used to create reports and drawings. The reports can be printed and the drawings can be printed. The reports can be printed and the drawings can be printed. The reports can be printed and the drawings can be printed.

With the advent of scanners, digital cameras, and CAD programs, even more information becomes available to the owner or manager. Scanned images, such as photographs, warranty documents or other information related to the roof, can become a valuable part of the

information available to the Roof Asset Manager. Stored images can result in very large files. Pictures can be stored in a variety of images and choosing the most compressed format will save considerable storage space in the computer. Storing scanned images within the database is inefficient. Keeping the database as lean as possible will provide faster operations.

Completing the Roof Evaluation by creating roof drawings and entering the roofing information into the roof management database are just the beginning steps of a successful roof management program. Using the data from the evaluation process will provide the owner with current information necessary to manage intelligently, instead of managing by crisis.

Reference information regarding the benefits of Roof Asset Management:

- Fricklas, Richard, "On the Roof, Who Really makes the decisions?" *RSI Magazine*, April 1993.
- Kalinger, Peter, "The Benefits of Preventive Roof Maintenance," *Interface*, August 1997.
- Kirby, James R., "Roof Maintenance Should Be Priority for Building Owners," *Professional Roofing*, April 1995.
- Mandzik, Steve, "The Leak Stops Here," *Interface*, August 1997.

About The Author



C. Bruce Cotton was a roofing contractor prior to opening his own consulting business in 1985. In 1986, he designed and developed REVS System 2000, a roof evaluation and management software. Bruce is a member of RCI and a Registered Roof Observer, as well as a faculty member with RIEL.