

Reroofing specs

AIA's updated MASTERSPEC[®] document contains important reroofing information that will help specifiers

by Thomas L. Smith, AIA, RRC

After a suitable roof system has been selected, appropriate specifications and drawings need to be prepared to help ensure the design concept and project requirements are understood and executed by a professional roofing contractor. If a project is competitively bid, it is more likely a quality-oriented contractor will be selected if the documents are thorough and well-prepared. The importance of a roof system designer's diligence in preparing specifications and drawings cannot be overemphasized for new or reroofing projects.

But reroofing design is substantially more complex than designing roof systems for new buildings because of several reasons, including the following:

1. An existing building generally is occupied, and there is risk of interior water damage, as well as occupant injury.
2. Existing conditions often present obstacles to good roofing practices.

3. Unknown conditions, such as a deteriorated roof deck or poorly attached edge flashing nailers, can pose problems.

4. The presence of friable, asbestos-containing fireproofing materials below a roof deck or membrane's underside or at flues can occur.

As a result of these issues, it is imperative designers involved with reroofing be diligent and thorough when evaluating existing roof assemblies and selecting, specifying and detailing new roof systems. To help roof system designers specify proper roof systems for reroofing projects, the November 2000 update of The American Institute of Architect's (AIA's) MASTERSPEC, which includes a new reroofing section, was published.

Master guide specifications

A master guide specification provides a framework, guidance and technical information for specifiers to use when developing comprehensive office

master specifications or writing project specifications. Master guide specifications typically are formatted according to criteria established by the Construction Specifications Institute.

AIA developed MASTERSPEC more than 30 years ago. Other commercially available master guide specifications include SpecLink by Building Systems Design Inc. and SPECTEXT by Construction Sciences Research Foundation. According to ARCOM, MASTERSPEC's publisher, MASTERSPEC is used by most large architectural and engineering firms and also is the most widely used master guide specification among small- to medium-sized firms.

The new MASTERSPEC reroofing section is Section 07591—Membrane Reroofing Preparation. The section focuses on preparing existing roof systems for reroofing. The document is intended to be used with other sections that specify new roof coverings and has the following five components: a one-page cover sheet, 14-page

evaluations section, 18-page guide specification for use in preparing the section text for a project, one-page drawing Coordination Checklist and one-page Specification Coordination Checklist.

Cover sheet

The cover sheet discusses the guide specification's scope, which includes preparations for low-slope membrane reroofing, including roof re-cover, tear-off and partial roof tear-off; removal of base flashings; temporary roofs; and protection of existing roof areas that are not reroofed.

The section addresses reroofing of existing built-up, modified bitumen, single-ply and sprayed polyurethane foam (SPF) roof systems with either built-up, modified bitumen, single-ply or SPF materials.

The section does not include preparations for reroofing over a metal roof system or reroofing with a metal roof system because of additional complexities associated with metal roof systems. A future section may be developed to address metal roofing or reroofing over metal roof systems. Roof system maintenance and repairs also were excluded.

Evaluations

The 14-page evaluations document, referred to as the green sheets because the evaluations are printed on green paper, is intended to help specifiers understand key issues associated with reroofing. The evaluations were adapted from *Low-Slope Roofing II*, which will be published later this year by the National Council of Architectural Registration Boards.

The evaluations document notes the complexities and additional parameters associated with reroofing design, as well as the necessity of design diligence, and provides definitions of key terms. It also states that architects who do not have considerable reroofing design expertise should consult a professional roof consultant or roofing contractor.

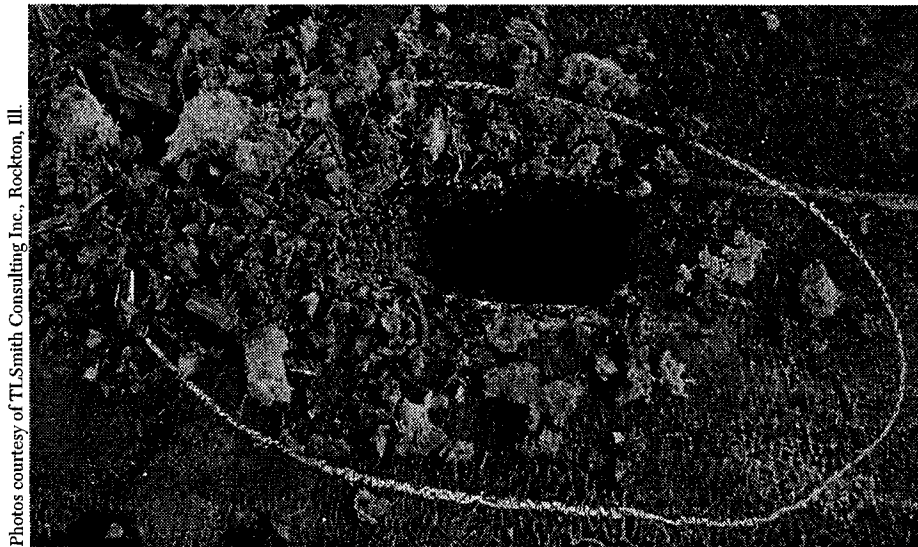
In addition, it notes the critical importance of having existing roof systems evaluated by an investigator experienced with the type of system currently in place. The evaluation's purpose is discussed, and guidance is given for taking test cuts to assess system composition (see Photo 1). This section also discusses nondestructive evaluation techniques that often help to determine the extent of moisture within roof systems. Evaluating a roof deck's structural integrity and checking for asbestos-containing materials also are addressed.

Several publications produced by NRCA and other associations are listed as references for further information pertaining to evaluating existing roof systems. These include *Manual of Roof Inspection, Maintenance, and Emergency Repair for Existing Single-Ply Roofing Systems* (developed by SPRI and NRCA in 1992); *Manual for Inspection and Maintenance of Built-Up and Modified Bitumen Roof Systems: A Guide for Building Owners* (developed by the Asphalt Roofing Manufacturers Association and NRCA in 1996); and *Manual for Inspection and Maintenance of Spray Polyurethane Foam-Based Roof Systems: A Guide for Building Owners* (developed by the Spray Polyurethane Foam Division of The Society of the Plastics Industry and NRCA in 1998).

After an evaluation, the first decision to make is whether a roof system should be repaired or reroofed. Guidance is presented to help make this decision, including the following example: Sometimes, spending a few thousand dollars, depending on a roof system's size, for repairs is a prudent course of action. However, it is important to avoid making a significant expenditure on repairs that only provide short-term relief. For example, removal and replacement of insulation that became saturated because of a punctured membrane can be an appropriate solution if the remainder of the roof system has several years of remaining service life.

The distribution of wet insulation also can influence a repair or reroof decision. For example, if the wet area is contiguous, a removal is more economical than if there are several areas of wet insulation. But if a roof membrane is at the end of its life, it would be prudent to reroof the entire building.

The advantages and disadvantages of tearing off and re-covering a roof system are presented to help a roof system designer make appropriate, informed decisions. A variation of re-covering is mentioned that states an existing membrane may be removed and existing insulation retained (provided it is dry). This



Photos courtesy of T.I. Smith Consulting Inc., Rockton, Ill.

Photo 1: This test cut was taken to determine roof system composition. Although the interior side of the tongue-and-groove deck did not exhibit any signs of deterioration, significant wood deterioration was discovered at the test location.

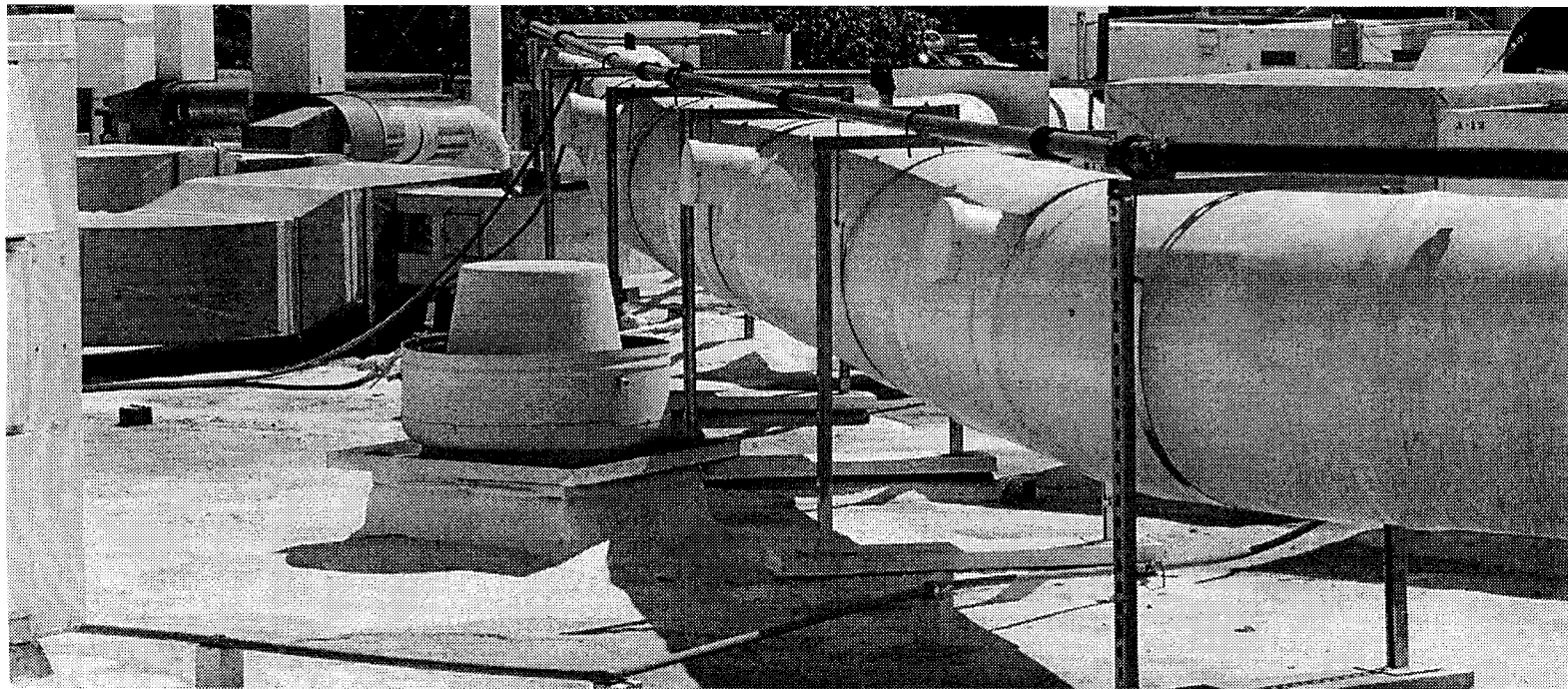


Photo 2: This roof is littered with rooftop equipment. Reroofing such a roof system presents a difficult challenge to roof system designers and roofing contractors.

approach's advantages and disadvantages also are discussed.

Under certain conditions, it is noted that it is economical to upgrade a roof system's thermal performance without reroofing by adding insulation or changing the roof system's reflectivity. Various evaluations that should be performed before executing a thermal upgrade are discussed, such as the following:

- Verifying that the increased thermal resistance will not adversely affect a roof system's fire performance
- Evaluating an existing roof system to determine whether the roof system has sufficient remaining service life to justify proceeding with a thermal upgrade
- Estimating the cost of an upgrade and performing life-cycle cost analysis to verify a thermal upgrade is justified

The green sheets also note that temporary roofs are not needed on most reroofing projects. However, the document states that, in some cases, it may be cost-effective for a roofing contractor to remove all or a large portion of a roof system and install a temporary roof. In some rare cases, a temporary roof may be desired when reroofing a building that has interior conditions

sensitive to leakage. Guidance is given for these two scenarios.

In addition to the general design considerations associated with designing a roof system for a new building, 12 bullet items pertaining to reroofing design are listed in the evaluation document. Four additional considerations are listed if re-covering is contemplated, including:

- Nondestructive evaluation always should be performed (except for those roof systems where such evaluations are not applicable) during the design stage. Areas of wet insulation should be identified and specified for removal.
- Several large test cuts (2 feet by 2 feet [610 mm by 610 mm] minimum) should be taken to assess roof deck integrity and attachment during the design stage. The number of cuts will depend on several factors, including the deck type, roof system size, leakage history and extent of wet insulation. Where possible, a deck's underside also should be evaluated.

The document notes that reroofing above or adjacent to an existing roof system that is not part of the reroofing project can harm the roof system that is to remain. Guidance is given for

evaluating a roof system before and after reroofing. Information also is provided regarding specifying protective measures.

In addition to the information routinely included in specifications and drawings for new roofing projects, 15 bullet items regarding specifications and drawings for reroofing projects are given, including the following:

- If heating, ventilating and air-conditioning (HVAC) equipment needs to be shut down during roof system installation, specify that the shutdown be coordinated with the building owner. If air intakes are in the work area, specify that the intakes are to be shut down and covered if the type of work likely will cause objectionable odors or fumes to be drawn into the building.
- If fire-detection devices need to be shut down (for example, duct or plenum smoke detectors) because of concern about activation caused by dust or fumes, specify coordination of the shutdown procedures with a building owner. Specify whether special measures need to be taken by a contractor during the deactivation of a fire-detection system, such as implementation of a fire watch or working only during specific hours or days.

- Specify that roof areas have suitable roof drainage at the end of each day. For example, if roof drains are blocked to keep out debris while employees are working, specify that the drains be unblocked when a roofing crew is not working. Also, if the existing drainage pattern is blocked by demolition or partial installation of a new roof system, some method for eliminating ponded water needs to be incorporated so nighttime rainfall does not result in roof system collapse.

Six bullet items pertaining to reroofing projects are provided in addition to the routine activities associated with construction contract administration related to new roofing projects. For example, the following are discussed:

- During a pre-roofing conference, a roofing contractor's foreman should be advised under what conditions an architect should be consulted concerning unforeseen conditions. For example, roof deck integrity parameters should be established. Generally, an architect would not need to be consulted if superficial surface corrosion is found. But if advanced corrosion is discovered, the need for corrective action typically should not be determined by a contractor.
- An architect (or other person who will provide construction contract administration services) needs to quickly respond to unforeseen conditions to avoid keeping a roofing crew idle.

Section text

As is typical with master guide specifications, the document's goal is to minimize the amount of text specifiers will need to add for specific projects. To achieve this, text is included to address a variety of conditions—many of which will not apply to a specific project. A specifier needs to delete the text that does not apply. The master text also includes several editor's notes to guide specifiers in tailoring text for projects.

The section text states that in submittal requirements, a fastener

pull-out test report is required if fastener pull-out testing is specified. Submittal of photographs or videotapes also is required before field work begins to show site improvements (including sidewalks and landscaping) and exterior and interior finish surfaces that might be construed as having been damaged by reroofing operations.

During a prereroofing conference, several items are to be discussed, including the following:

- Roof drainage during reroofing operations, roof drain plugging and plug removal
- Procedures to determine the condition and acceptance of an existing roof deck and base flashing substrate for reuse
- Roof deck loading limitations during reroofing
- HVAC equipment shutdown and sealing of air intakes
- Fire-alarm and -detection system shutdown
- Procedures to be followed if asbestos-containing material is found unexpectedly
- Under "Project Conditions," the guidelines state that work activities should be coordinated daily with a building owner so the owner can place protective covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area if desired.

Criteria are given to address an existing warranted roof system that is not to be reroofed. The document states that a contractor is to notify the warrantor before proceeding and if a roof system is damaged, it is to be repaired so as not to void the warranty. Furthermore, it states a contractor is to submit documentation from the warrantor that the existing roof system was inspected after the adjacent reroofing work was completed and the warranty remains in effect.

Execution

In the guide specification's execution portion, application guidance is given

to help specifiers write appropriate requirements. For example, roof system tear-off provisions include the following:

- Bitumen and felts firmly bonded to concrete roof decks are permitted to remain if felts are dry.
- The option of removing insulation and/or membrane fasteners from a roof deck versus cutting them off is addressed.
- If only a roof membrane is to be removed, the roof membrane's substrate is to be immediately checked for moisture by visual observation. In addition, spot checking with an electrical capacitance meter is required. Damp and wet boards are to be removed, and the contract sum adjusted according to the unit price schedule, which should be established and submitted with a bid.
- If a protected membrane roof system is being reroofed and extruded polystyrene boards are to be reused, a maximum board weight is specified so boards with high moisture contents will not be reused.

Roof deck preparation provisions include field test methods for verifying concrete sufficiently is dry and notifying the designer of record whether fasteners that secure deck panels to one another or to the structure are broken or loose, a deck appears or feels inadequately attached, a deck's surface is not suitable for receiving new roofing materials or the structural integrity is suspect.

The provisions also state that if additional deck securement is required, the location and nature of the additional securement are to be noted on the drawings. And if roof deck replacement is required, the location is to be noted on the drawings and work specified in the appropriate section.

If an existing membrane is to remain, membrane preparation provisions include several scenarios for preparation work depending on the type of existing and new membranes.

If new insulation or a membrane is to

be mechanically attached, fastener pull-out testing according to SPRI FX-1, "Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fastener," is specified. A specifier can require a contractor to perform the testing, or an independent testing laboratory retained by the owner can perform it. The contractor is to obtain approval from the designer of record to proceed with the specified fastening pattern, or the designer of record may furnish a revised

fastening pattern commensurate with the pull-out test results.

If re-cover boards are to be installed over existing insulation or a roof membrane, criteria for their installation are provided. Different criteria are given to address various new roof system options.

Checklists

In addition to the general instructions for coordinating drawings and

specifications, a Drawing Coordination Checklist itemizes several things that should be indicated on drawings, such as delineation of deck areas that require replacement or reattachment; locations of new and existing penetrations, as well as penetration details; and details of existing or replacement nailers for edge flashings and copings, including attachments.


In addition, the Specification Coordination Checklist gives the section numbers and titles that may need to be included in a project manual. The checklist notes that provisions in the reroofing section will need to be coordinated with the provisions specified in the other related sections.

Using the new section

Although the new reroofing section was written for architects, it equally is applicable to engineers and roof consultants who write reroofing specifications. The section also can be beneficial to roofing contractors who develop proposals for building owners. By using a master guide specification, a comprehensive scope of work can be developed quickly by a contractor and presented to a building owner.

Future updates

Before the new section's release, a review committee composed of architects and specifiers from across the United States reviewed and commented on a draft. As with other sections, the reroofing section will be reviewed periodically and updated by ARCOM's specification writing staff and AIA's architectural review committee. Input also will be solicited from various roofing industry associations. These periodic reviews and updates will help keep the section current and consistent with good roofing practices.

To obtain a copy of the new reroofing section, contact ARCOM at (800) 424-5080 or visit its Web site, www.arcomnet.com. 

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