

PMT GUIDE # 10

Book of Order Section G-10.0102o: "The session is responsible for the mission and government of the particular church. It therefore has the responsibility and power . . .to provide for the management of the property of the church, including determination of the appropriate use of church buildings and facilities, and to obtain property and liability insurance coverage to protect the facilities, programs, and offices, including members of the session, staff, board of trustees, and deacons."

PURPOSE OF THIS GUIDE

To review existing masonry parapet walls and related 'flat' roof systems of existing church structures in consideration of maintenance and repair to insure their integrity.

INTRODUCTION

Parapet walls and associate roof systems are generally 'out of sight/out of mind'. Unfortunately these components receive the most serious consequences of constant exposure of temperature ranges, wind, rain, and freeze/thaw cycles. In general terms, roofing systems will be more likely the source of building leaks than parapets. Comments in this guide relating to roofing/flashings to parapet walls apply in general to all flat roofs.

This memorandum assumes traditional solid masonry wall construction only.

Selection of products and systems for a particular project is a mutual responsibility of church personnel, qualified masons and roofing contractors and consultants as may be appropriate.

INSPECTIONS

Parapets and roofing systems should be inspected either by church personnel and/or by qualified contractors as follows:

- 1) In the fall after leaves have fallen to insure a clean system for winter.
- 2) In the spring to review for any damage due to winter exposure. The timing is important to allow for repairs, if required, prior to the next winter season.
- 3) When inspecting roof systems, wear flat-soled shoes for safety and to avoid making any roof penetrations. Do not step on any roof blisters. Penetration of these areas will promote roof leaks.
- 4) Except for emergency situation, inspections should be avoided during winter months due to icing conditions of roofs. It is recommended not to remove snow/ice due to risk of damage to roofing/flashings systems promoting leaks and, more importantly, the risk of injury to inspecting personnel.
- 5) Should 'serious' defects be observed (e.g. bowed or out-of-plumb walls or rotted decking), consideration should be given to retaining professional consultants and/or qualified masons/roofers for resolution and repair/restoration.
- 6) Parapets and roofs, depending on the building's accessibility, may be difficult to inspect. Church personnel may not be comfortable or able to manage ladders and access to higher places. Contractors are accustomed to these situations and have the appropriate equipment for property access. Recommendation: if in doubt, retain the contractor. Safety first!
- 7) In consideration of access difficulty, the use of digital cameras, with zoom capability, is recommended, both for church personnel and retained contractors, and consultants. The use of cameras is an excellent means by which to examine parapet/roofing conditions and to record a maintenance and repair history of these building elements.

- 8) As a matter of coordination, PMT GUIDE #5 is an appropriate reference for overall building interior and exterior maintenance checklist and for establishing of a building maintenance program

PARAPETS

- 1) Copings: Serve to direct water from the top of parapet walls. Materials such as stone, clay tile and brick are thermally compatible with masonry walls. Coping tops must slope and project beyond parapet wall faces with drip notches for proper water runoff. The fewer unit joints the better. Brick coping are therefore more susceptible to moisture penetration. Due to temperature differentials of exposure, coping joints tend to open up and should be re-sealed with flexible sealants to prevent water intrusion. Metal copings with drip edges have fewer joints but require expansion joints.
- 2) All copings require a base flashing continuous at the top of the masonry wall to prevent water penetration into the wall system. For low parapets (e.g. about 12" or less in height), the flashing is usually a continuation of the roofing base flashing. In the case of tall parapets, an independent membrane, e.g. "sisalkraft", would be used extending the edges of the flashing beyond the wall faces to provide "drip edges" to divert water from the face of masonry. Flashing selection must be resistant to puncture and UV deterioration. Asphalt-impregnated felt and plastics tend not to meet these criteria.
- 3) Parapet walls: Are solid masonry construction, and are a vertical extension of the building wall systems. Evidence of moisture and freeze/thaw penetration includes loose and/or open mortar joints, spalled unit faces, loose masonry units and efflorescence. Defective joints require removal of material and re-pointing with new mortar. Existing 'surface tuck-pointing' of in-place joints probably hides defective joints, and is not an effective tuck-pointing technique. Remove and replace mortar joints to a depth at least equal to the width of the joint. Replace cracked and/or chipped masonry wall and coping units. All replacement units to be 'in kind' or original units.
- 4) As general recommendation, avoid sealing the exterior faces of masonry walls to resist moisture penetration. The wall system naturally will accept and must be able to evaporate moisture. Retention of moisture within the wall system could be a factor in promoting mold growth. If a wall sealant is selected, it must allow moisture to escape.
- 5) A final thought on parapet walls and copings: Delayed or 'forgotten' maintenance of these components promotes the potential intrusion of excessive moisture that, over a period of time, will cause damage to masonry unit(s) and wall integrity and will be a contributing factor of rusting and spalling of steel lintels particularly over wall openings (windows, doors) in the floor directly below the roof system. Repair/removal and restoration of the wall system, together with associated roofing and flashing systems will be costly; maintain a program of timely inspections and maintenance.

ROOFING SYSTEMS

- 1) Drainage: This guide discusses 'flat' roofs in relationship to parapets. The roof should drain down 'positively' either to related gutters, interior roof drains or roof drains at the vicinity of the interior face of the parapet or by scuppers penetrating the wall to exterior downspouts. All drains should be maintained clear to maintain drainage flow. In many cases, the size of drains or scuppers may be undersized, requiring clearing openings. The units should have their top (invert) level lower than the adjacent roof to insure positive drainage. If such is not the case, the units should be correctly modified. Existing scuppers may have a raised edge at the roof, blocking drainage. If such is the case, providing a weir notch to the roof level may be appropriate.
- 2) Roofing repairs: Roofing inspection by church personnel and/or by a roofing contractor should include the general aging condition of the roofing and flashing, blister, cracking, differential movement, ponding, penetrations and ballast (gravel or other weighty materials) continuity. Repairs should be by qualified roofing contractors. Some form of record-keeping of repairs is recommended to plan ultimately for roof/flashing replacement.

- 3) Roofing replacement: If the decision is reached to replace a roofing system, the present roofing should be cored to determine the number and type of layers already in place. This is important as building departments are now allowing a new system to be installed only over one in-place layer. More than one layer will probably require the removal of the existing roofing to the structural deck. Additionally, building departments may require the installation of insulation (R-19 or as specified) prior to roofing installation, thereby affecting modification to present structures (e.g. drains, scuppers) to accept the new increased roof thickness.

Selected roofing systems and their compatible base flashing is a determination to be made by the church, roofing contractor and any consultant as may be appropriate. A 20-year system is recommended. Examples include but are not limited to the following:

- a) Modified, NO TORCH
- b) Adhesive, hot asphalt
- c) Single-ply

FLASHINGS

- 1) All base flashing sealing the roofing system to parapet walls must be compatible with the roofing system selected. Ideally, the flashing should extend up the full height of the parapet wall and over the wall top to develop a single system. If the parapet wall is high, the base flashing should extend a minimum of 8" and preferably 12" above the roofing level. Depending on the roofing system, cant (angled) strips at the wall base may or may not be required. Flashings that do not extend the full wall height have the top edge counter-flashed with thru-wall metal flashing or termination bar.
- 2) Metal flashing components should be selected for a 20-year life to match that of the roofing system. Copper minimum thickness is .032 inches. Aluminum (for copings, termination bars) is minimum of .040 inches and should be anodic-coated. Galvanized sheet metal is more subject to rusting within 2 to 3 years. Metal flashing integral to the roofing system should be replaced at the time of roofing replacement.
- 3) While the discussion of this guide stresses base flashings to parapets for 'flat' roofs, the same principles apply to sloped roofs (e.g. metal, slate or shingle surface) that pitch down to parapet walls. Drainage must be positive as described in paragraph #1 of 'ROOFING SYSTEMS.' Base flashings should extend a minimum of 12" up and under pitched roof roofing materials.
- 4) Differences of opinion exist within the building trades and professional consultants as to whether the backside of parapets should allow some exposed masonry above base flashing to assist in moisture evaporation of the wall system. As described in this guide, low heights (maximum 12" high) in height are usually continuous with base flashing to the coping, while taller walls have flashings terminating approximately 12" above roof height with separate coping flashings High wall flashing have a potential of separating from the wall thereby promoting leak potential.

REFERENCE PHOTOGRAPHS

The enclosed photographs define examples of roofing and parapet failures, and are submitted as general references for evaluation and comparison to a particular church/building needs and conditions.

In addition, for those interested in background information on design of parapets (not for do-it-yourselfers), please click on PMT – Publications [Detailing masonry parapets](#) by Walter Laska.

Updated 11/23/09



Flat roof flashed to brick parapet— good example with metal cap flashing, membrane under coping



Brick parapet completely disintegrated from water penetration and freezing



Wood termination bar for roofing at parapet. An inferior installation



Wood termination bar failure admits water to parapet (see results below)



Note dark patches on brick indicating soaking from water penetration in the parapet



Lintel rusting expansion due to water from parapet: note bowing out, cracking of masonry



Note open brick joints and ice forming from water in the parapet and wall below



Note soaking and water of brick at corner due to poor flashing and/or scupper design



Note extent of sanctuary plaster damage due to poor flashing at parapet—since repaired.



Note rusting lintel at top of window due to failure of flashing and open brick joints at roof above



Note plaster damage at ceiling and stained glass window due to flashing failure above



Note extended crack in brick joint resulting in ceiling damage in three rooms below