WALL STRUCTURE WITH MOISTURE DIVERTER AND METHOD OF MAKING SAME

Inventor: John H. Koester, St. Michael, MN (US)

Correspondence Address:
IPLM GROUP, P.A.
POST OFFICE BOX 18455
MINNEAPOLIS, MN 55418 (US)

Assignee: Masonry Technology, Inc.

Appl. No.: 12/545,182

Filed: Aug. 21, 2009

Related U.S. Application Data

Provisional application No. 61/090,763, filed on Aug. 21, 2008.

Publication Classification

Int. Cl.
E04B 1/64 (2006.01)
E04B 2/02 (2006.01)

U.S. Cl. ......................... 52/302.1; 52/745.09

ABSTRACT

System and method for making a wall structure which diverts moisture from an opening. The wall structure has a structural member with a horizontal opening. A moisture diverter is secured to the structural member above the opening, the moisture diverter having a first end and a second end and a length, with the diverter length greater than the horizontal opening distance and the first end positioned relatively higher than the second end. The moisture diverter is laterally positioned at least partially over the horizontal opening. The moisture diverter has a first planar portion and a second planar portion attached to the first planar portion, forming an acute angle. A moisture barrier is secured to the structural member, at least in part, within a volume defined by the first planar portion and the second planar portion. A facade member is secured to the structural member distal of the moisture barrier.
Fig. 2
Construct support member

Secure moisture barrier to structural member

Obtain moisture diverter

Secure moisture diverter to structural member

Secure facade member to structural member

Form opening

Fig. 4
WALL STRUCTURE WITH MOISTURE DIVERTER AND METHOD OF MAKING SAME

RELATED APPLICATION


FIELD

[0002] The present invention relates generally to devices, systems and methods of making a wall structure, and in particular a wall structure with a moisture diverter.

BACKGROUND

[0003] Wall structures for many different types of buildings commonly incorporate two or more layers of materials in order to achieve the typical goals of providing relative isolation between the interior of the building and the exterior of the building, of maintaining the structural integrity of the building, and of providing decoration. As is typically the case, the basic component of a wall structure may be a structural member, either load-bearing or otherwise, onto which other building materials may be secured. Facade members which may primarily serve a decorative function may be secured on the outside of the structural member. Facade members may also provide isolation between the interior of the building and the exterior of the building, by providing insulation and water impermeability. Even if the facade member is relatively impermeable to water, a moisture barrier may commonly be positioned between the structural member and the facade member in order to prevent moisture (liquid or vapor) which penetrates the facade member from coming into contact with the structural member, which may then prevent rot or mold. Other materials are also commonly utilized in building wall structures.

[0004] In one sense, it may be preferable to build wall structures with no interruptions or variations within the structure. By making wall structures uniform, water which contacts the exterior of the wall structure may tend to run down the facade member or the moisture barrier evenly and uniformly. Moreover, without interruptions, a constant moisture barrier may be effective in preventing most or all water which contacts the wall structure from coming into contact with the structural member. In general, the less water which comes into contact with the structural member, the less rot or mold the structural member may experience and the longer the structural member may tend to retain the ability to support the wall structure as a whole without replacement, which may be expensive or necessitate replacing the entire wall structure.

[0005] However, it is often desirable to provide openings in wall structures for doors, windows, ventilation, and other functions. Such openings create non-uniformities in the wall structure, which inherently create openings in the moisture barrier. These openings in the moisture barrier may tend to expose the structural member to water from outside the building. While various treatments and articles have been created to mitigate the introduction of water to the structural member arising from openings on the moisture barrier from openings in the wall structure, relatively large amounts of water which contact the wall structure in a short period of time, such as during rain, may exceed the capacity of the treatments or articles to prevent undesirable amounts of water contact with the structural member.

SUMMARY

[0006] A wall structure has been developed which may reduce the potential for an opening in the wall structure to result in moisture contact with the structural member. A sloped moisture diverter may be positioned above the opening, with the facade member and the moisture barrier positioned outside of the sloped moisture diverter relative to the structural member. The moisture diverter may be wider than the opening, such that when moisture runs down the facade member or the moisture barrier the water contacts the sloped moisture diverter rather than simply coming into contact with the opening.

[0007] Because the moisture diverter is sloped and wider than the opening, the moisture may run down the moisture diverter, exiting the moisture diverter past the opening. Once the moisture falls off the moisture diverter it may continue down the wall structure, in the facade member or in contact with the moisture barrier, without the structural member being exposed to the moisture. As such, stress on the treatments or articles protecting the structural member around the opening may be reduced, and the structural member may be less prone to rot and decay.

[0008] In an embodiment, a method of making a wall structure formed of a structural member forming a horizontal opening having a horizontal opening distance and an opening top is disclosed. A moisture diverter is secured to the structural member above the opening, the moisture diverter having a first end and a second end and a diverter length between the first end and the second end, the diverter length being greater than the horizontal opening distance, the first end being positioned relatively higher than the second end, and the moisture diverter being laterally positioned at least partially over the horizontal opening and proximate the opening top. The moisture diverter comprises a first planar portion and a second planar portion attached to the first planar portion and forming an acute angle therewith. The moisture diverter is impermeable to liquid. A moisture barrier is secured to the structural member, at least in part, within a volume defined by the first planar portion and the second planar portion. A facade member is secured to the structural member distal of the moisture barrier.

[0009] In an embodiment, the facade member is positioned, at least in part, distal of the moisture diverter relative to the structural member.

[0010] In an embodiment, the facade member is positioned, at least in part, within the volume defined by the first planar portion and the second planar portion.

[0011] In an embodiment, the moisture diverter is secured with the first end being approximately one-quarter inch higher than the second end for every foot of length of the diverter length.

[0012] In an embodiment, the moisture diverter is secured with a midpoint of the moisture diverter being laterally coincident with a midpoint of the horizontal opening.

[0013] In an embodiment, a wall structure comprises a structural member, a moisture diverter, a moisture barrier and a facade member. The structural member forms an opening having a horizontal distance and an opening top. The moisture diverter, impermeable to liquid, is secured to the structural member above the opening and proximate the opening top.
The moisture diverter comprises a first planar portion and a second planar portion attached to the first planar portion and forming an acute angle therewith. The moisture diverter has a first end, a second end and a diverter length between the first end and the second end, the diverter length being greater than the horizontal opening distance, the first end being positioned relatively higher than the second end, and the moisture diverter being laterally positioned at least partially over the horizontal opening. The moisture barrier is secured to the structural member and distal, at least in part, of the first planar portion relative to the structural member. The facade member is coupled to the structural member distal of the moisture barrier relative to the structural member.

**DRAWINGS**

[0014] FIG. 1 is a cutaway view of a wall structure with a sloped moisture diverter;
[0015] FIG. 2 is a schematic drawing of the moisture diverter of FIG. 1;
[0016] FIG. 3 is profile view of the wall structure of FIG. 1; and
[0017] FIG. 4 is a flowchart for building the wall structure of FIG. 1.

**DESCRIPTION**


[0019] Structural members of wall structures may be relatively vulnerable to exposure to water, which may create rot or decay. Moisture barriers have been created to prevent water from coming into contact with the structural member. Creating openings in wall structures for doors, windows, ventilation or other functions is desirable but also creates points of relative weakness where structural members of the wall may be particularly vulnerable to exposure to water. A wall structure which diverts moisture from openings in the wall structure has been created, thereby potentially reducing the amount of moisture which flows to the opening in the wall structure and reducing the potential exposure of the structural member to moisture.

[0020] FIG. 1 is a cutaway view of wall structure 10. Structural member 12, in an embodiment conventional exterior sheathing well known in the art, is combined with a conventional structural support, in an embodiment a standard dimensional lumber to a metal stud, to support, at least in part, wall structure 10. In various common embodiments, it is impractical, particularly for cost reasons, to treat structural member 12 such that structural member is impervious to moisture. As such, the more moisture which comes into contact with structural member 12, the more likely structural member may be to rot and decay.

[0021] In the illustrated embodiment, moisture control member 16 is attached to structural member 12 in order to drain from the wall structure moisture which may enter the wall structure, for example, either through condensing water vapor or liquid water. Moisture control member 16 may be made from several different materials, including combinations of materials. Moisture control member 16 may be that member described in U.S. Pat. No. 6,990,775, Koester, Moisture Draining Product, Wall System Incorporating Such Product and Method Therefore, which is hereby incorporated by reference in its entirety. As illustrated in FIG. 1, moisture control member 16 includes two layers of asphalt impregnated construction paper 18 and drainage member 20 of Sure Cavity™ drainage material made by Masonry Technology, Inc. Moisture control member 16 may be configured such that moisture which comes into contact from the outside of wall structure 10 may drain from the wall structure by draining down moisture control member 16 and past structural member 12.

[0022] Facade member 22 may be positioned outside of moisture control member 16. Facade member 22 may provide both aesthetic benefits to wall structure 10 as well as moisture control intended to reduce or prevent liquid water or water vapor from entering the wall structure from the exterior and provide additional protection against weathering and other damage. Facade member 22 may be many different materials commonly known in the art, including wood, stone, and brick. As illustrated, facade member 22 is primarily comprised of stucco 24, as illustrated comprising three layers. Metal lath 26 is secured to structural member 12, whereupon stucco 24 may be applied to lath 26 to secure the stucco to wall structure 10. In the case of stucco, stone or brick, an additional water impermeable barrier may be used between the stucco, stone or brick to provide moisture impermeability.

[0023] Opening 28, as illustrated window 30, may be formed in wall structure 10. Conventionally, opening 28 may be formed simply by selecting appropriately sized materials for structural member 12, moisture control member 16 and facade member 22. Alternatively, opening 28 may be cut into wall structure 10 by cutting through the various layers 12, 16, 22. As is well known in the art, openings 28 may also be doors, ventilators, or other common openings. Window 30 may conventionally be secured and affixed in wall structure 10 by securing devices, metal termination 34, caulking 36 and backer rod 38.

[0024] Wall structure 10 further includes sloped moisture diverter 40. Sloped moisture diverter 40 may be made from conventional metal sheeting, in an embodiment galvanized steel. Sloped moisture diverter 40 may include first planar portion 42 and second planar portion 44. Combined, first planar portion and second planar portion combine to form channel 46. By positioning first planar portion 42 between moisture control member 16 and structural member 12, moisture which runs down moisture control member 16 may drip into channel 46 of sloped moisture barrier 40.

[0025] In an embodiment, sloped moisture barrier 40 has first end 48 and second end 50 defining a length of moisture barrier 40. In an embodiment, opening 28 likewise has a first end 52 and a second end 54 defining a horizontal width or distance of opening 28. In an embodiment, sloped moisture diverter 40 may be positioned above and proximate opening top 29 of opening 28 such that each end 48, 50 of sloped moisture diverter 40 projects a distance beyond each end 52, 54 of opening 28. In addition, sloped moisture diverter 40 may be positioned such that for every foot of length of sloped moisture diverter 40, first end 48 is one-quarter inch higher than second end 50. In alternative embodiments, second end 50 is positioned higher than first end 48. As such, sloped moisture diverter 40 length may be selected in order to meet those criteria relative to the horizontal width or distance of opening 28.

[0026] In alternative embodiments, the four inch projection of ends 48, 50 beyond ends 52, 54, respectively, may be varied, and the one-quarter inch per foot slope characteristic may be varied, depending on the particular circumstances,
particularly relating to an amount of moisture which may be expected to contact wall structure 10 and the conditions in which the moisture may contact wall structure 10. In circumstances where relatively high winds may tend to blow large amounts of rain against wall structure 10, it may be desirable to increase the slope of sloped moisture diverter 40 while increasing the overall length of moisture diverter 40 in order to divert relatively greater amounts of water away from opening 28 relatively more quickly.

Fig. 2 is a schematic drawing of sloped moisture diverter 40. In an embodiment, first planar portion 42 is one and seven-eighths inches tall and second planar portion 44 projects five-eighths inches beyond first planar portion 42. In an embodiment, second planar portion 44 is angled at 65 degrees relative to first planar portion 42. In an embodiment, the material of sloped moisture diverter 40 may be 0.024 inches thick. In alternative embodiments, these dimensions may be altered. In particular, second planar portion 44 may be angled at greater or lesser angles and may project greater or lesser amounts from first planar portion 42. Such differing dimensions may be selected on the basis of the conditions in which sloped moisture diverter 40 are going to be used. If relatively large amounts of moisture may be expected to drain into sloped moisture diverter 40 then first planar portion 42 and second planar portion 44 may be selected such that channel 46 is relatively larger. If relatively little moisture is expected then first planar portion 42 and second planar portion 44 may be selected such that channel 46 is relatively smaller.

Fig. 3 is a side-view of wall structure 10. Moisture control member 16 and sloped moisture diverter 40 may be affixed to structural member 12. As illustrated, asphalt impregnated construction paper 18 may be made in two parts, with first planar portion 42 positioned between top part 56 and structural member 12, and bottom part 58 positioned between sloped moisture diverter 40 and structural member 12. As illustrated, drainage member 20 may be positioned within channel 46. In alternative embodiments, drainage member 20 may be positioned outside of channel 46, at least in part.

As illustrated, facade member 22 is positioned outside of channel 46. In alternative embodiments, facade member 22 may be positioned inside of channel 46, at least in part. In an embodiment, metal lath 26 and at least one layer of stucco 24 may be positioned within channel 46. In such an embodiment, sloped moisture diverter 40 may provide structural support to facade member 22. Such structural support may be improved by increasing the size of first planar portion 42 and second planar portion 44, to provide greater contact area with facade member 22 and structural member 12, thereby potentially improving an ability to secure sloped moisture diverter 40 to structural member 12 and a support area with facade member 22.

Fig. 4 is a flowchart for creating wall structure 10. Structural member 12 may be constructed (400). Moisture control member 16 may be secured (402) to structural member 12 and sloped moisture diverter 40 may be obtained (404) and secured (406) with first planar portion 42 to structural member 12 in a manner consistent with the structure of Fig. 3. In an embodiment, sloped moisture diverter is secured to structural member such that end 48 is one-quarter inch higher than end 50, and ends 48, 50 extend four inches beyond ends 52, 54 of opening 28.

Securing (402) moisture control member 16 and securing (406) sloped moisture diverter 40 may occur concurrently or in sequence. The steps may occur concurrently particularly to create wall structure 10 consistent with the embodiment of Fig. 3, in which case bottom part 58 of moisture control member 16 may be secured to structural member 12, followed by sloped moisture barrier 40, followed by top part 56 of moisture barrier.

Facade member 22 may then be secured (408) to structural member 12. Optionally, opening 28 may be formed (410) in order to permit the insertion of window 30. Alternatively, and in an embodiment preferably, opening 28 is formed during steps (400), (402), (406) and (408) by selecting building materials such that opening 28 does not have to be cut in wall member 10.

Various modifications and alterations of this invention will be apparent to those skilled in the art without departing from the scope and spirit of this invention. It should be understood that this invention is not limited to the illustrative embodiments set forth above.

What is claimed is:

1. A method of making a wall structure formed of a structural member forming a horizontal opening having a horizontal opening distance and an opening top, comprising the steps of:

   - securing a moisture diverter to said structural member above said opening, said moisture diverter having a first end and a second end and a diverter length between said first end and said second end, said diverter length being greater than said horizontal opening distance, said first end being positioned relatively higher than said second end, and said moisture diverter being laterally positioned at least partially over said horizontal opening and proximate said opening top, said moisture diverter comprising:
   - a first planar portion; and
   - a second planar portion attached to said first planar portion and forming an acute angle therewith;
   - said moisture diverter being impermeable to liquid; and
   - securing a moisture barrier to said structural member, at least in part, within a volume defined by said first planar portion and said second planar portion; and
   - securing a facade member to said structural member distal of said moisture barrier.

2. The method of claim 1 wherein said facade member is positioned, at least in part, distal of said moisture diverter relative to said structural member.

3. The method of claim 1 wherein said facade member is positioned, at least in part, within said volume defined by said first planar portion and said second planar portion.

4. The method of claim 1 wherein said securing a moisture diverter step secures said moisture diverter with said first end being approximately one-quarter inch higher than said second end for every foot of length of said diverter length.

5. The method of claim 1 wherein securing a moisture diverter step secures said moisture diverter with a midpoint of said moisture diverter being laterally coincident with a midpoint of said horizontal opening.

6. A wall structure, comprising:
   - a structural member forming an opening having a horizontal distance and an opening top;
   - a moisture diverter, impermeable to liquid, secured to said structural member above said opening and proximate said opening top, said moisture diverter comprising:
a first planar portion; and
a second planar portion attached to said first planar portion and forming an acute angle therewith;
said moisture diverter having a first end and a second end and a diverter length between said first end and said second end, said diverter length being greater than said horizontal opening distance, said first end being positioned relatively higher than said second end, and said moisture diverter being laterally positioned at least partially over said horizontal opening;
a moisture barrier secured to said structural member and distal, at least in part, of said first planar portion relative to said structural member;
a facade member coupled to said structural member distal of said moisture barrier relative to said structural member.

7. The wall structure of claim 6 wherein said facade member is positioned, at least in part, distal of said moisture diverter relative to said structural member.

8. The wall structure of claim 6 wherein said facade member is positioned, at least in part, within a volume defined by said first planar portion and said second planar portion.

9. The wall structure of claim 6 wherein said a moisture diverter is positioned said first end being approximately one-quarter inch higher than said second end for every foot of length of said diverter length.

10. The wall structure of claim 6 wherein said moisture diverter is secured with a midpoint of said moisture diverter being laterally coincident with midpoint of said horizontal opening.

* * * * *