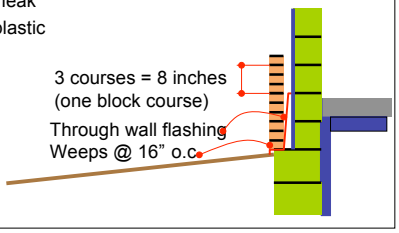
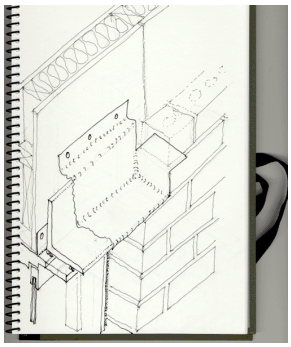
The contemporary masonry wall

- Designed to drain
- Kept dry with air cavity
- Expected to leak
- Uses foam plastic insulation



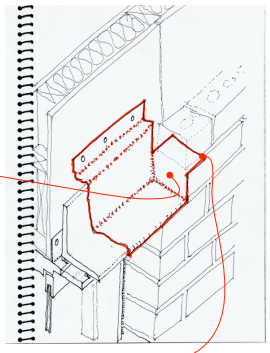
Flashing

- Flashing is our last line of defense against water penetration.
- ANYPLACE the cavity is interrupted (like for a lintel, or window, or door…) it has to be flashed to catch the water and wept to drain the water.



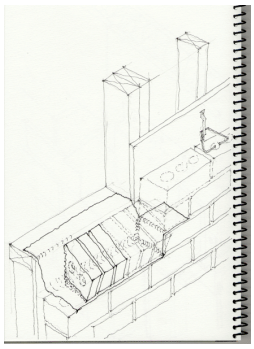
Ice dams - bad End dams - good

- Since we usually draw in orthogonal views (plan, section) we often overlook the ends of the flashing.
- One of the most common leaks in architecture occurs at the end of the thru-wall flashing.
- To prevent this, turn the flashing up at the end of the lintel and over the brick next to the lintel.



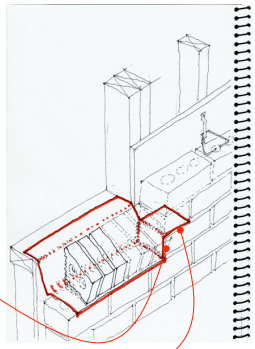
Dams for sills too

- The window sill gets flashed because it usually has some joints in it… at least at the ends.
- Here the sloped rowlock sill gets flashed and wept below the sill to prevent water leaking through the joints from getting into the wall.



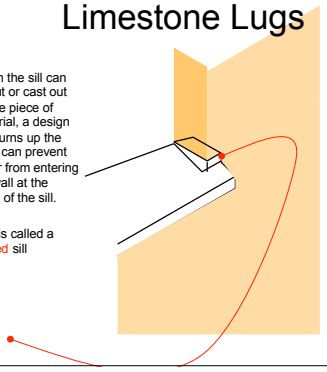
Sill dams

- At the end of the sill, the flashing is turned up and over the adjacent brick to form an end dam



Limestone Lugs

- When the sill can be cut or cast out of one piece of material, a design that turns up the ends can prevent water from entering the wall at the sides of the sill.
- This is called a lugged sill



Lugs…The way to avoid chemical dependence

- Richardson's big lug at the Glessner House

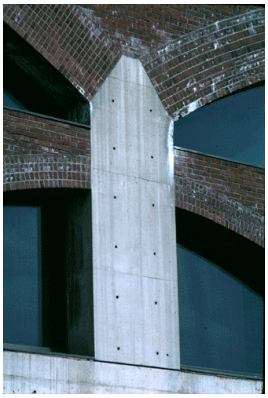
Chemically dependent

- The absence of lugs at the ends of this sill means the sealant is the only water barrier at the end of the sill…which may be good for the first ten or twenty years, then needs replacement

Efflorescence

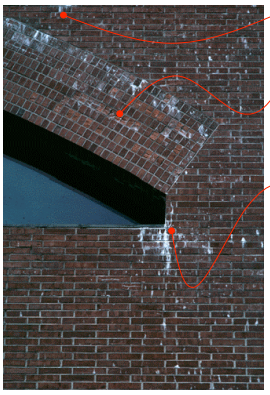
What happens *when* the masonry leaks

The white powder on the surface at the arches is efflorescence - salts dissolved out of the brick and mortar, which moved down the wall (following gravity) until the salt water hit an interruption in the wall (the arch.) The water soaked in the arch, evaporated through the arch face, leaving the salt deposits behind



Usually, a concentration of efflorescence is a sign of a leak.

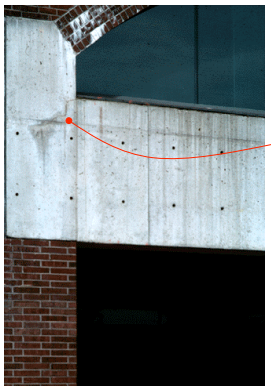
The leak is usually in a joint or material change above where the salt is found



Water leaking from parapet coping above.

Soaked bricks froze and the faces spalled off.

No end dam at the flashing under this slate sill.



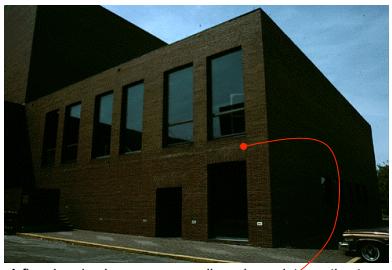
Water can even destroy large concrete elements.

Here, the lack of an end dam for the sill flashing has loaded the concrete with water, contributing to the crack.

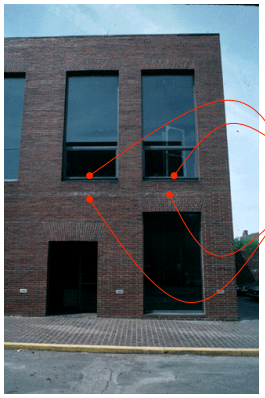
Years later, the arch was dis-assembled by removing and replacing alternating bricks (similar to underpinning.) As is often the case, finding matching bricks was almost impossible. The flashing was installed correctly and it looks like no leaks!

Setting the windows at the back edge of the wall instead of over the cavity increases the presence of the walls mass.

This requires that sill flashing and material be of the highest quality as it leaves a deep, low sloped sill to catch water and snow.

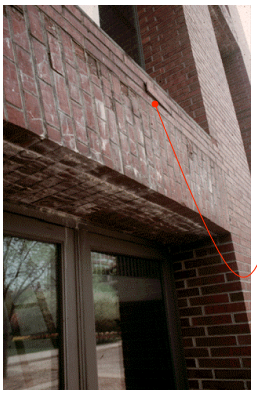


A floor bearing in a masonry wall can be an interruption to the free drainage of the wall. This faint white line indicates the sills above have leaked, the water has moved within the masonry downward, piling up at the floor where it evaporates out, leaving the salts on the brick surface.



Leak is likely here

Efflorescence at the top of the floor slab bearing on the masonry wall.



If not repair quickly the leaks fill the masonry with water. The freezing and thawing of winter and spring can blow the face off the brick

Go to the deteriorated location and look up to find the leak

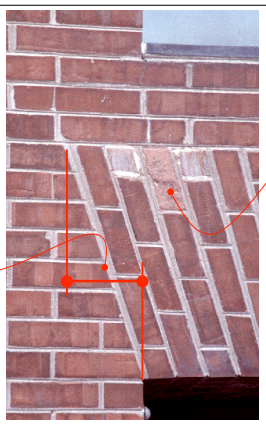
Slight rise on the bottom of the arch 1/8" per foot of span

The deterioration is mostly cosmetic, but because these arches bear load, the weakening brick has to be replaced.

The slate coping at the parapet has been removed, new flashing installed below the coping and the slate replaced.

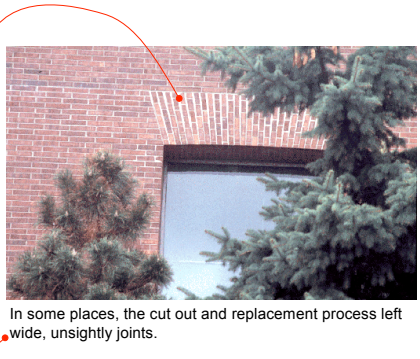
The bricks in the arch have to be cut out one at a time and new brick toothed in.

Skewback 1/2" per foot of span per 4" of arch depth



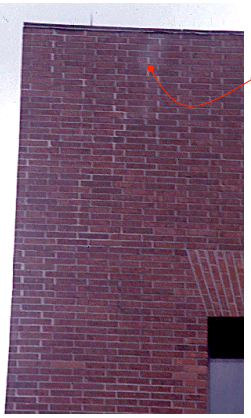
To save on costs of restoration, some patching material was painted over the brick.

Not very satisfactory in appearance.



In some places, the cut out and replacement process left wide, unsightly joints.

After all the work of removing the slate, reflashing below and re-installing it. Some well intentioned electrician drilled a hole through the slate, through the flashing to install a lightning rod.



Where is this leak coming from?

The worst case for the masonry was where it was exposed to moisture from both sides. What does the cooling tower behind this arch produce? How often?

This arch was deemed too badly damaged, and out of sight so it was covered up with cement stucco. How is the stucco doing?

The corners of the cooling tower enclosure were patched with some not-very-close-to-matching brick….

Or bondo, or patching compound.

Damage like this is pretty hard to repair to original condition.