

TECHNICAL NOTE NO. 2

SMALL HOMES COUNCIL-BUILDING RESEARCH COUNCIL, UNIVERSITY OF ILLINOIS, URBANA

BUILT-UP ROOFING DETAILS

DONALD E. BROTHERRSON, AIA
RESEARCH ASSOCIATE PROFESSOR OF ARCHITECTURE

UNIVERSITY OF ILLINOIS

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Twenty-five Cents

On low-slope roofs where built-up roofing membranes are used, roofing details become extremely critical, and many failures have occurred when the traditional details were used. Over the last three years, while working with the National Roofing Contractors Association, the SHC-BRC has developed a series of new details for built-up roofing.

While it is not too difficult to achieve watertight surfaces for our walls and roofs, the line or joint where these two surfaces meet can be the most vulnerable area of the whole structure. In new and old construction alike, it is the roof edge, parapet,

chimney penetration, and the like that give us trouble. Many reports of wall and roof leaks, efflorescence on masonry walls, failure of paint on fascias, and even roofing failures can be traced back to a flashing failure.

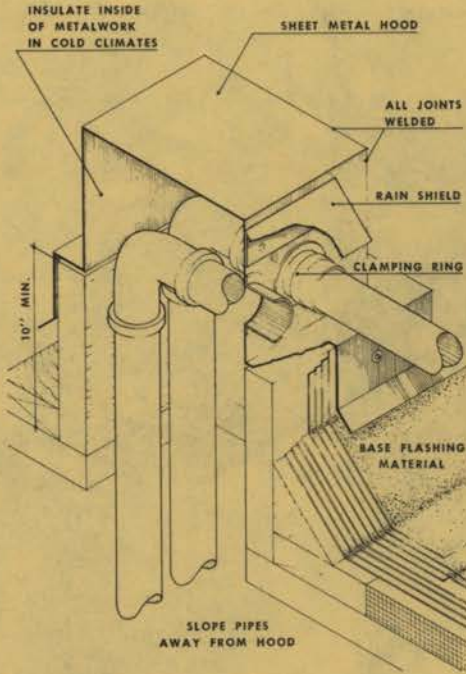
Flashings are normally subjected to some of the worst conditions possible on a building. They usually join two planes of different materials with varying characteristics of thermal movement and different movements due to loading. Flashings are exposed to severe weathering and possible mechanical damage from traffic over the roof and from hail. Therefore, they must be designed to be flexible enough to withstand differential movement and yet be strong enough to withstand puncturing and other abuses. The design of the joint and the choice of materials will determine the success or failure of this most important aspect of building construction.

There are two principles that can be applied to achieve this end. We can call these

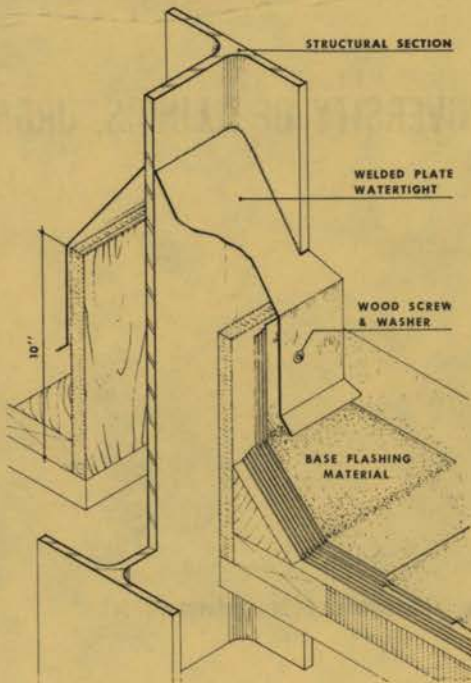
1. the "drip-dry" method, and
2. the "chewing gum" method.

In the first method, we design so that water that penetrates the joint is conducted to the surface before it can reach the interior, and in the second we seal the joint completely so that no water penetration is possible.

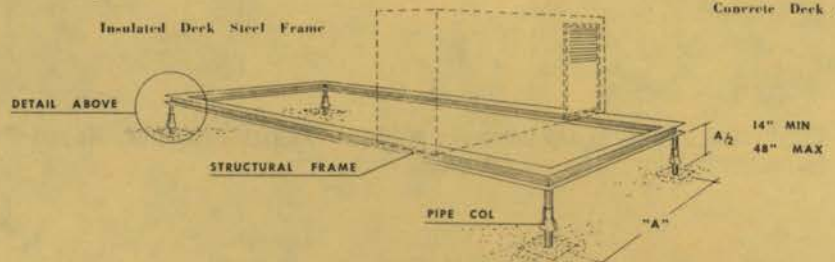
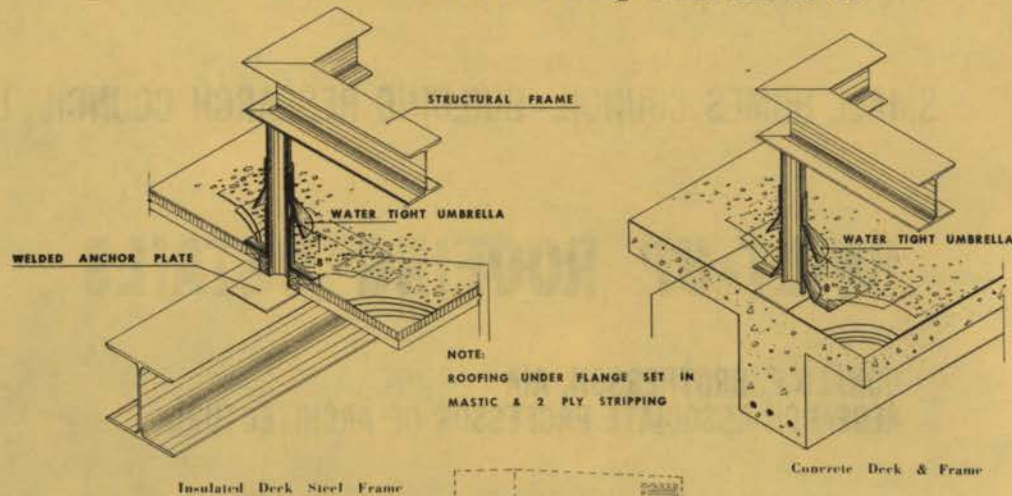
One of the main objects in developing these details was to separate the fabric or felt part of the flashing from the metal work wherever possible, since these materials are handled by two different trades and frequently by different sub-contractors. Another object was to attempt to keep the metal work above the "water-line" on the roof where possible. The metals used in the roof flashing systems have different characteristics of thermal expansion and contraction than the roofing membrane. If the



PIPING THROUGH ROOF DECK



STRUCTURAL COLUMN THROUGH ROOF DECK

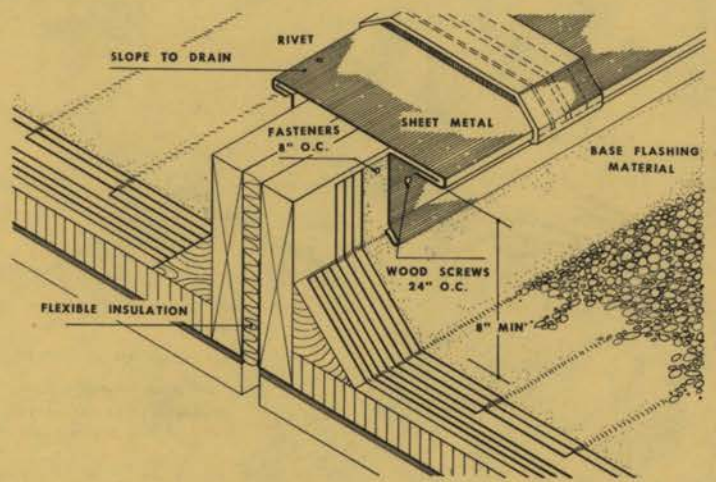


MECHANICAL EQUIPMENT STAND

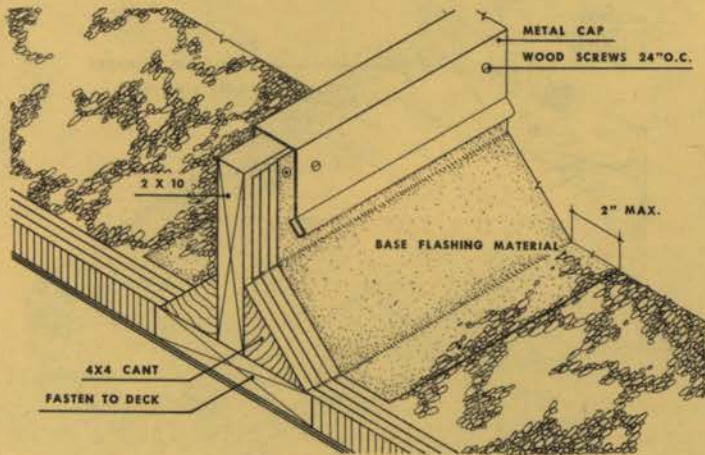
metal is tied to the membrane, as is frequently done, it will move and eventually tear the flashing and membrane, allowing water to enter the building.

Two methods can be used to control this situation. The metal can be attached to the structure at close enough intervals so that the movement is restricted to very small increments. This would require nailing or fastenings at intervals as close as three inches on center. This is only effective with light gauge metals such as 16 oz. copper, 24 ga. galvanized, or 0.040" aluminum. With heavier gauge metals or extrusions, this method will not be effective.

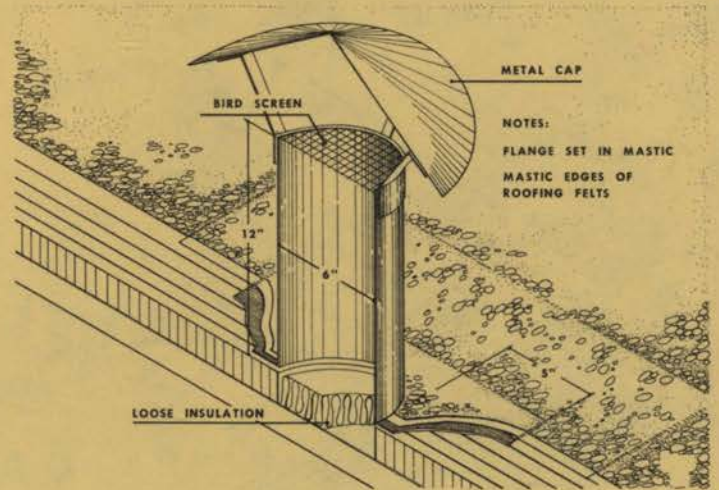
The other solution to the problem is to raise the metal above the water line. Then, any breaks caused by movement of the metal will not be vulnerable to water penetration. Or, the metal can be attached so that it is free to move without causing any movement in the underlying flashing materials. This approach can be seen in many of the accompanying details.



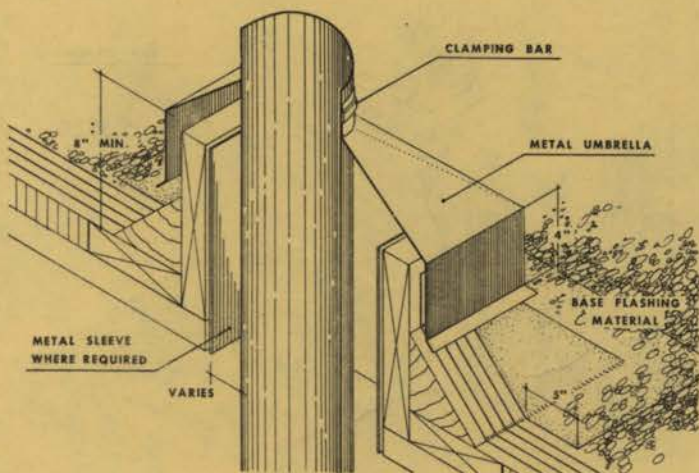
EXPANSION JOINT



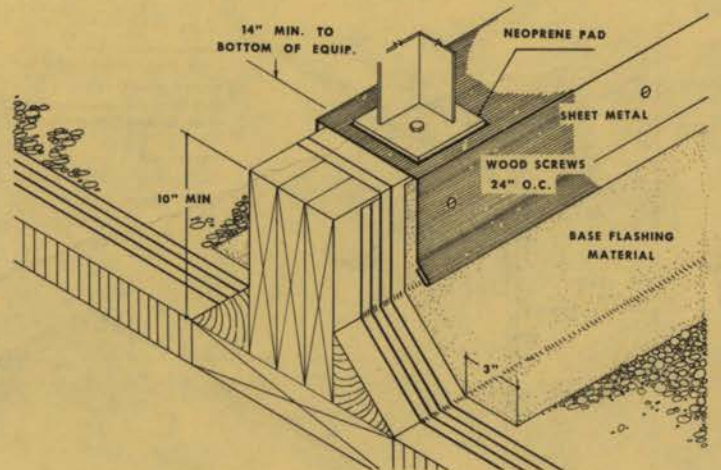
ROOFING RELIEF JOINT



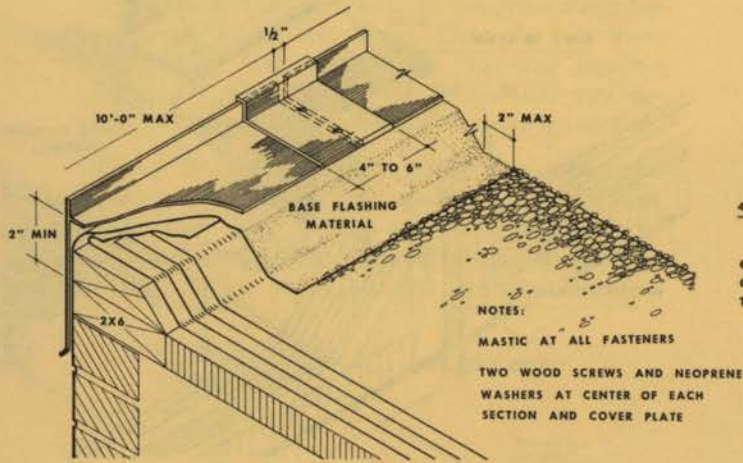
ROOF RELIEF VENT



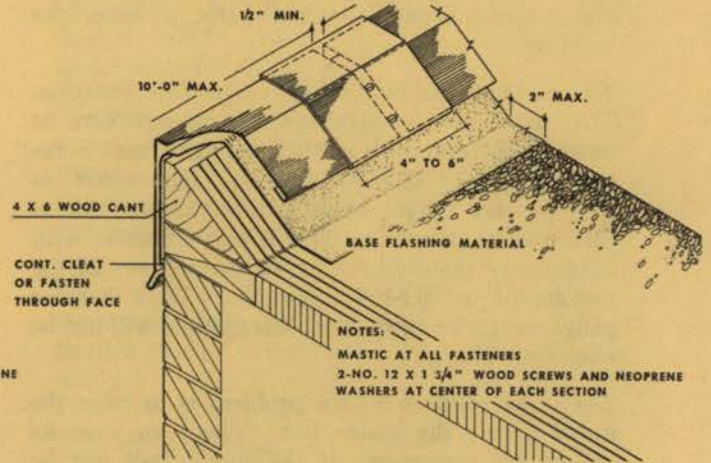
STACK FLASHING



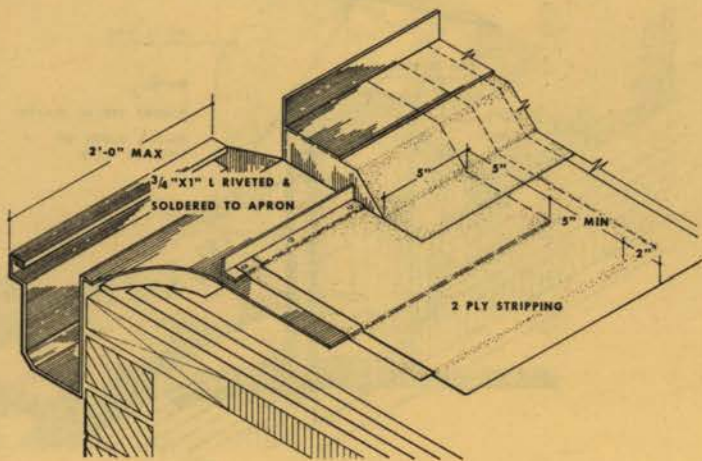
EQUIPMENT SUPPORT



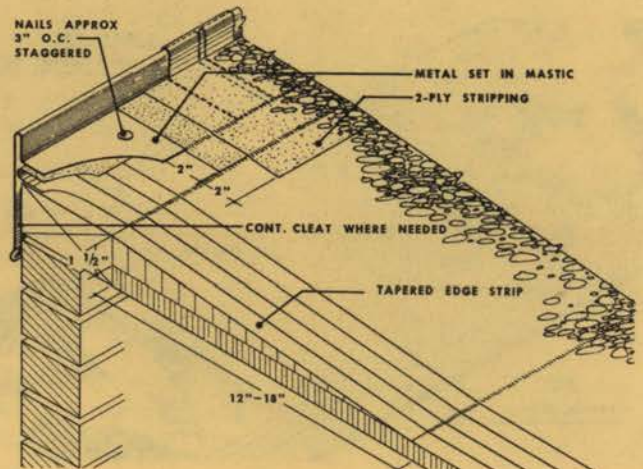
ROOF EDGE DETAIL



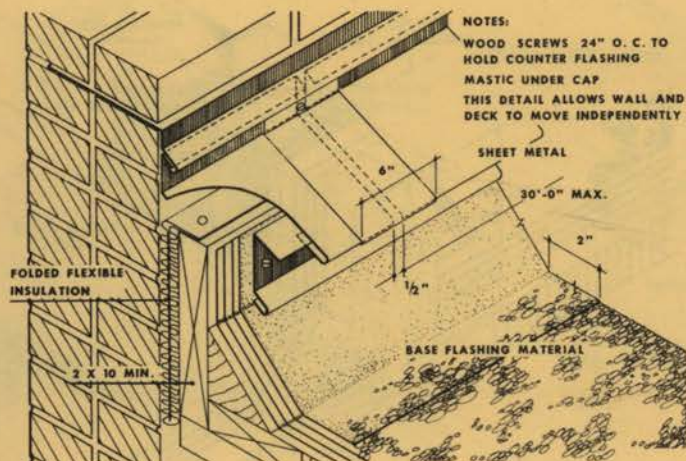
METAL ROOF EDGE



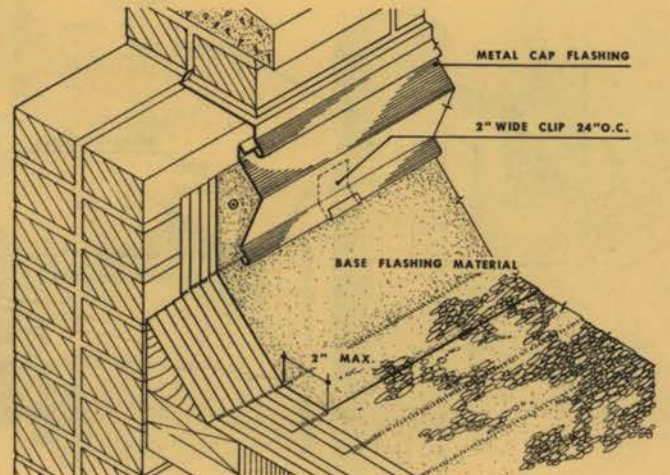
SCUPPER THROUGH ROOF EDGE



TAPERED EDGE STRIP



WALL FLASHING DETAIL



BASE FLASHING AND INSERT WALL COUNTER FLASHING