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Cant Strips

The CRCA Roofing Specification manual defines a cant strip as "...a strip of material of triangular section placed at the intersection of a roof deck with a higher wall or other vertical surface." Cant strips have been, and continue to be widely used as a component of built-up roofing. However, with the advent of many new types of membrane systems some confusion has arisen as to when and where cant strips are required. In addition, there are a large variety of materials being used in the fabrication of cant strips. This bulletin discusses the use of cant strips and the various types available.

Built-up (Asphalt) Roofing Systems

The reinforcing felts used to construct built-up roofs are relatively stiff materials, particularly at lower temperatures. Bending them sharply creates stress at and adjacent to where they are bent, creating the possibility of mechanical fatigue, or rupture of the reinforcing fibres at the bend. Many of these reinforcements, such as fibreglass, have a property that is referred to as "memory". This attribute makes them want to straighten out and return to their original shape upon being bent. When installed in a tight bend they can pull away from the transition before the asphalt has cooled and set, leaving a void or gap at the change in plane. As a result, the membrane at this location is left unsupported and susceptible to damage due to thermal and moisture induced stress or mechanical impact.[1] A cant strip at horizontal/vertical junctions reduces the stress by changing the angle of the bend from 90° to 135° providing a smoother and less acute transition (see Fig. 1).

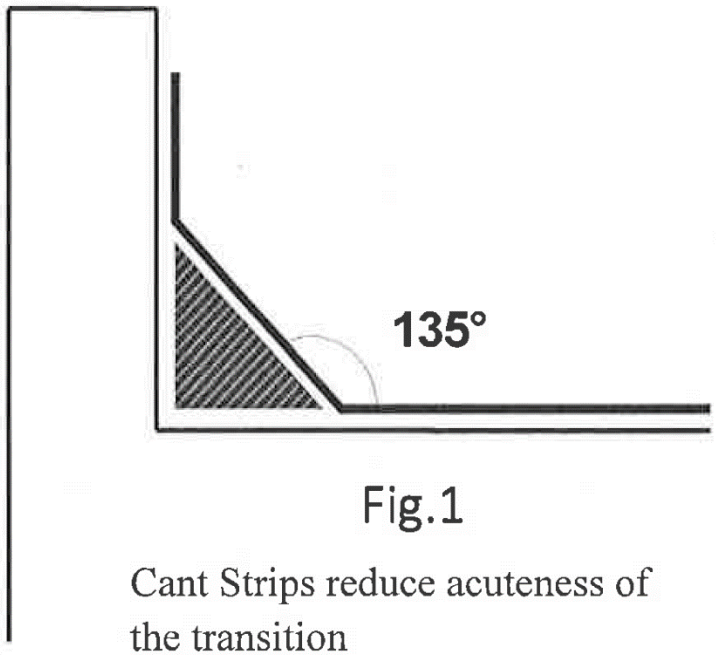

Fig.1

Cant Strips reduce acuteness of the transition

It also serves to act as a support for the membrane, reducing the potential for damage from mechanical impact from foot top traffic.

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Modified Bitumen Membranes

Some manufacturers of modified bitumen membranes have eliminated cant strips from their design detail requirements in torch-applied assemblies. They claim that due to the mechanical properties of the reinforcements, typically polyester, and the polymer modified asphalt coatings they are not subject to potential stress related problems as are traditional reinforcement materials. Other manufacturers continue to show cant strips in their design details. Designers and contractors should consult the product manufacturer to determine if cants are required on a specific project.

Single Ply Membranes

Elastomeric and plastomeric single ply roofing systems do not require cant strips nor are they recommended. Single ply membranes are flexible enough to be easily bent and conform to an acute (90°) angle without stressing the membrane. While cant strips serve no purpose on a single ply roofing system, a membrane fixation strip or bar should be installed at the roof/wall intersection. Due to the relatively weak peel strength of the bonding adhesive, securing the membrane at the angle change by adhesive alone cannot be relied on to resist its tearing or pulling away at the transition from thermally induced, seismic or wind loads. Manufacturers recommend attaching the membrane at transitions with suitable fixation strips or bars that are mechanically fastened to supporting members.

Cant Strip Materials

Almost any material can be used to form cant strips - concrete, wood, steel, insulation and insulation composites. The appropriate type for use on a particular project depends on the membrane system being installed and the specific performance requirements.

Cants made of hard materials, such as wood, concrete, or metal, are typically used where resistance to mechanical damage is required. Membranes secured to hard substances are less likely to incur puncture damage then are softer materials. Wood cant strips can also be used where structural support may be required, such as to reinforce field fabricated curbs or skylights. They can also be used for attaching vertical membranes to horizontal ones, or to add rigidity to the assembly. Wood cants are the most suitable for use at perimeter edges where there are no parapets to provide an elevated termination designed to shed water away from the roof edge and to provide a nailing base for the membrane termination and metal edge flashing.

Wood cants are typically nailed, screwed, bolted or otherwise mechanically attached. When properly installed, membrane terminations, and metal flashings attached to wood cants can provide the necessary wind uplift resistance at perimeters and edges to meet FM requirements (See FM Loss Prevention Data 1-49 Perimeter Flashing).[2] Where wood cants are used they should be constructed from dry and seasoned lumber resistant to fungal and insect attack. Care must be taken to ensure that the membrane base flashing material will not be adversely affected when in contact with pressure treated lumber or wood that has been treated with chemical preservatives.

Wood fibre cants have been used in the construction of low sloped built-up roofs for decades. Wood fibre cants should be adhered to the supporting substrate with hot, or cold applied bitumen. They should not be used where a nailing base or solid support are required. Other cants made of flame resistant or noncombustible materials (i.e. perlite, mineral fibre) are also available. Designed primarily for open flame applications, these are being promoted for use in modified bitumen systems where the

membrane is torch applied. It should be noted that although these products may be flame resistant, they might not provide sufficient protection to combustible components behind them during application of the membrane. Extreme caution should always be exercised when torching membranes (See CRCA Roofing Specifications Manual for safety precautions when applying modified bitumen membranes).

On the basis of the rate of displacement of hydrogen from hydrochloric acid, metals may be arranged in an activity series. For those metals not affected by hydrochloric acid, other reactions are used.

If pieces of two different clean metals are electrically connected and placed in an electrolyte the more active one (higher electrode potential) tends to go into the solution and the less active one tends to be protected from the solution; e.g. zinc protects iron in galvanized sheet. Further any metal will displace from its salt in water solution a metal lying below it in the series. Thus iron will displace copper from a copper salt solution; e.g. an iron nail in a solution of copper sulphate is rapidly coated with copper.

ZINC. The rate of corrosion is worst under conditions of frequent wetting and drying in an industrial atmosphere where the moisture is distinctly acid. In such cases the formation of the basic protective film is hampered. Nearly all metals receive substantial to complete protection when in contact with zinc. Small zinc areas in contact with large areas of more electropositive metals should be avoided. Small areas of other metals in contact with large areas of zinc are relatively safe. Galvanized will be attacked in the presence of copper. Exposed junctions of galvanized and copper should be avoided because ofcorrosive attack on the zinc at the junction where there could be water (electrolyte) bridge to complete a galvanic cell circuit.

LEAD. Sheltering or coating of lead with other materials is not required for atmospheric exposures because of the protective film. Due to the electric insulating nature of this protective film, lead does not usually cause galvanic corrosion of troublesome magnitude when in contact with other metals.

Conclusion

It is widely accepted that roof flashings at openings, transitions and roof edges are the most vulnerable areas of the roof, accounting for the majority of all roofing problems. Depending on the configuration of the roof, and the type of membrane materials used, cant strips may be required at locations where the roof meets a vertical surface at walls, curbs, and projections or at roof edges. Numerous types of cant strips are available to the contractor and roof designer. The appropriate type of cant strip will depend on the nature of the membrane and flashing materials, the specific details and the performance requirements.

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References:

1. Kirby, J.R., *Cant Strips for bituminous roofing*, Professional Roofing, March 1997.
2. Data Sheet 1-49, *Perimeter Flashing*, Factory Mutual Research.

The opinions expressed herein are those of the CRCA National Technical Committee. This Technical Bulletin is circulated for the purpose of bringing roofing information to the attention of the reader. The data, commentary, opinions and conclusions, if any, are not intended to provide the reader with conclusive technical advice and the reader should not act only on the roofing information contained in this Technical Bulletin without seeking specific professional, engineering or architectural advice. Neither the CRCA nor any of its officers, directors, members or employees assume any responsibility for any of the roofing information contained herein or the consequences of any interpretation which the reader may take from such information.