

FIGURE 6.6 Exposed-fastener panels: Butlerrib II by Butler Manufacturing. (a) Prepunched panels and purlins ensure correct alignment. (b) Seam details with lock rivet. (c) Panel cross section. (Butler Manufacturing Co.)

For self-drilling screws, there are three main modes of failure: pullover, pullout, and shear (Fig. 6.8). In a pullout failure the screw loses its grip, while in the pullover failure the material around the screw fractures. For heavier-gage materials (from 22 ga. to 1/4-in thick), the pullout capacity typically controls; for thinner gages, pullover may govern. The pullout capacity of the fastener depends mostly on the drill point size, diameter of the shank, and the number of threads per inch. The pullover capacity depends chiefly on the head style, and to a lesser degree, on the drill point size.¹⁴

6.4.4 Protection against Leaks and Corrosion

To minimize vulnerability of through-fastened roofing to leaks at the points of attachment, rubber or Neoprene washers are provided under the fasteners' heads. Unfortunately, this protective measure is only as good as the workmanship of the installer. In order for the gasketed washers to function properly, the screws must be driven to a proper depth. This is accomplished by using electric screwdrivers or similar tools with accurate depth control.

Self-Drilling Screws



#12 x 1"



#14 x 3/4"

Self-Tapping Screws



#14 x 3/4"

Scrubolt



Lock Rivets



FIGURE 6.7 Fasteners used by one manufacturer to attach through-fastened roofing to purlins and to one another. (The scrubolt is used only for attachment to purlins.) (Butler Manufacturing Co.)

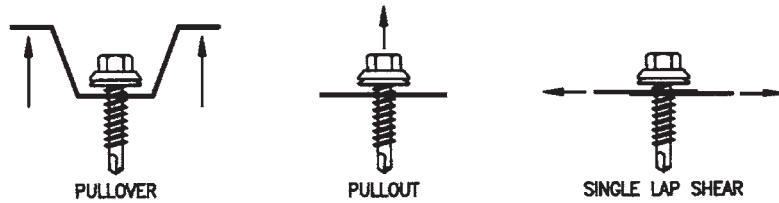


FIGURE 6.8 Various failure mechanisms for screw-type fasteners. (MBMA.)

A properly installed screw has its Neoprene washer slightly visible from under the edge of the metal washer (Fig. 6.9a). When the Neoprene material cannot be seen from under the metal (Fig. 6.9b), the screw probably is not tightened enough, but when the Neoprene appears “squished” (Fig. 6.9c), the screw may be overtightened.¹⁵ An overdriven fastener can dimple the metal panel and invite water to collect in the depression, further worsening the situation. The screws must be driven perpendicular to the panel, otherwise the Neoprene will be squished on one side and not compressed enough on the opposite side.

Exposed fasteners without a durable corrosion-resisting coating invite trouble. The better ones are made of stainless steel or aluminum; galvanized or cadmium-plated screws are best left for interior applications. To reduce complaints about fastener visibility, exposed fasteners may have a color-coordinated head finish (or be fitted with colored plastic caps, a previously popular but now largely obsolete solution).