

Press roll edge relief

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The purpose of edge relief or end dubbing is to relieve the load at the ends of the roll cover. By relieving load, edge relief prevents the chance of any excessive stresses from occurring within the cover. Such excessive stresses, if large enough, could cause premature failure of the cover.

After a roll cover has been manufactured, residual stresses exist within the cover. Since the ends of the roll constitute a discontinuity in the cover material, the residual stresses in this area are much larger than the remainder of the cover. One point to keep in mind is that the stresses from the manufacture of the roll cover are separate from the stresses that result from loading two rolls together. However, these two distinct sets of stresses are additive, and the additional stresses from loading can cause the total stress in the cover to approach the maximum stress of failure. In other words, the ends are more likely to reach maximum stress first since they are already at a higher state of stress. As an example, even with uniform load across the entire face of the roll and no end dubbing, the stresses in the cover will be greater

at the ends than at the quarter points or center. Edge relief prevents loading in this area of higher stress and helps to produce uniform stress throughout the cover.

This condition can be exaggerated when nonuniform loads exist in the press due to improper crown, stiff ends due to large heads, "tin can" or hoop bending phenomenon, temperature variations such as with Yankees, and cover thickness variations due to large crowns. Therefore, edge relief is used to overcome several problems which can cause excessive loading (stresses) on the ends of roll covers.

Although all roll covers have the stresses discussed, certain applications require more attention than others. One example is hard roll covers. At the same time, there are also applications that have some limitation that prevents the use of edge relief, such as with a size press.

Edge relief should always start as close to the sheet edge as possible and be great enough to prevent excessive loading as indicated by a nip impression. This is complicated by the fact that sheet widths change from press to press and from product grade to product grade. A general rule is to start the dub based on the width of the sheet plus 2 in., and to taper 0.375 in./ft on diameter. Although not always possible, the best dubs start at least 5 in. from the ends of the roll. This guarantees that loading will take place within the area of lowest residual stress as discussed above. The press should then be checked with a nip impression and the effect of the edge relief determined and corrected if required. □

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