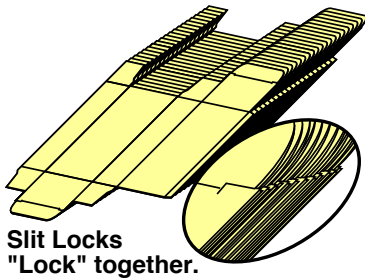
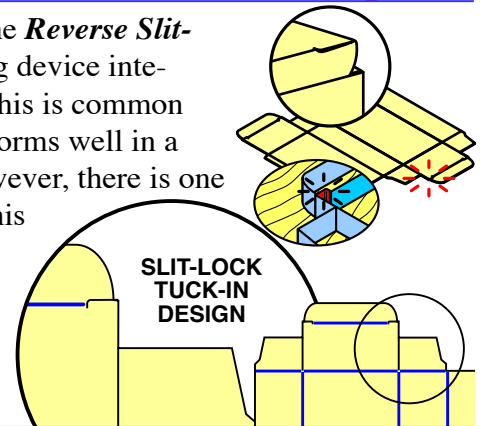


**Category: Diecutting Folding Problem Title: Slit Lock - Locking!**

## PROBLEM

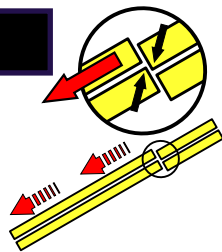


One of the most common folding cartons is, the *Reverse Slit-Lock Tuck-In* design, which features a locking device integrated into the tuck and tuck flap. *See right*. This is common because it is a very reliable design, which performs well in a variety of diverse packaging applications. However, there is one finishing problem, which is very common to this design of carton. As the cartons are fanned out for insertion into the gluing machine hopper the slightly overlapping Slit Locks of each carton "lock" or "catch" on the carton above and below. *See left*.

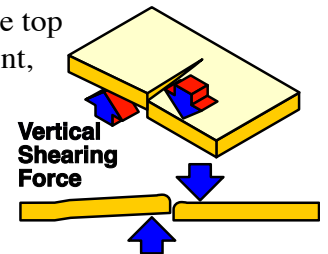


## CAUSE

impossible. In print-to cut. As the slit lock diecutter tends to over alignment of the tuck carton is drawn down causes the leading edge of the tuck flap of the top carton to bind with the leading edge of the tuck panel of the lower carton. *See above*. Therefore, we need to accomplish two things to prevent this happening. First, we need to cut the slit lock and at the same time, slightly deflect it to ensure all the fibers are severed. *See right*. I know, this sounds like we are creating the very problem we are trying to avoid! The second step is that we permanently deflect the slit lock flap in the opposite direction, to eliminate locking!

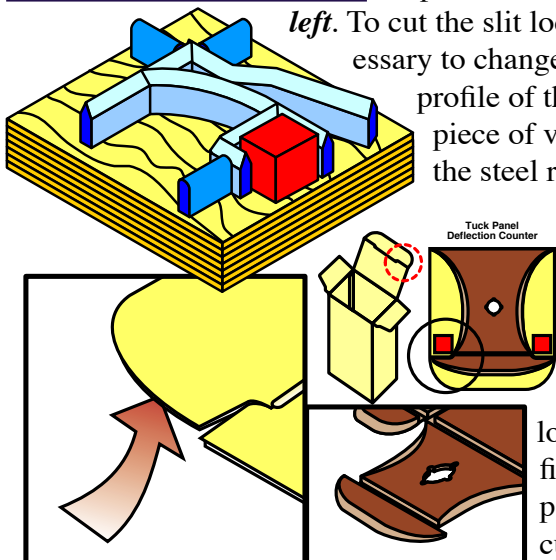


This type of binding of one carton with another makes feeding a sequential stream of accurately distanced, individual cartons almost ciple this is caused by applying excess pressure to get the slit lock is an internal cut, and it is the most critical feature of the carton, the patch this area of the design. This can cause a slight distortion in the panel and the top flap. What happens, is as the top into the feeder hopper, this slight misalignment,

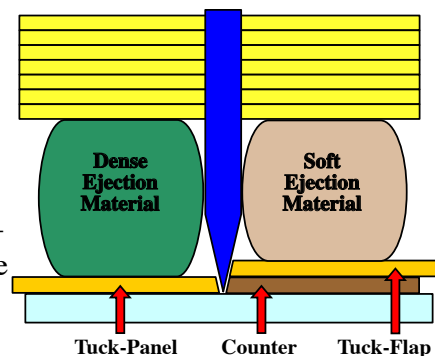


## SOLUTION

To accomplish this type of permanent deflection it is necessary to modify the shape of the counter and the ejection used on the slit lock in the steel rule die. *See left*. To cut the slit lock, and to permanently deflect the tuck-flap slightly upward, it is necessary to change the profile of the fiberglass counter, so the counter traces the upper profile of the slit lock knife. In a similar fashion it is necessary to add a small piece of very dense ejection material to the underside of the slit lock knife in the steel rule die. *See left*.

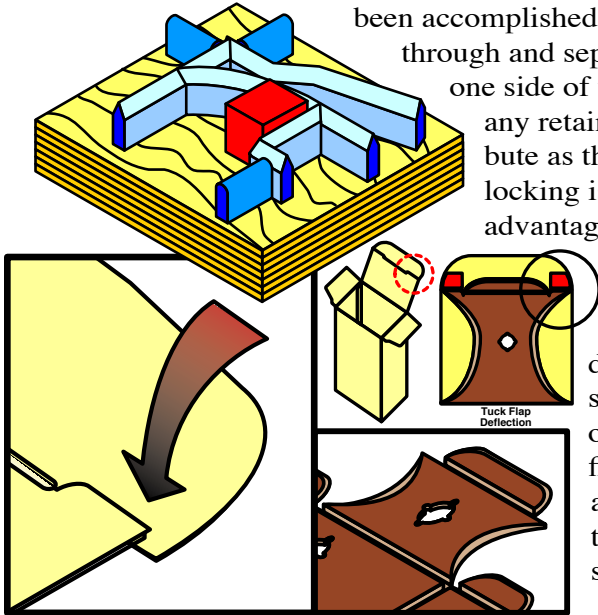


As the male and female tools go on impression, the cutting knife makes kiss-cut contact with the cutting plate as normal, however, the material on the side of the slit lock knife with the close counter profile is no longer in alignment with the paperboard on the other side of the cut, the tuck panel. *See right*.



## SOLUTION

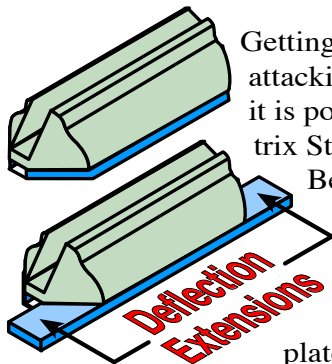
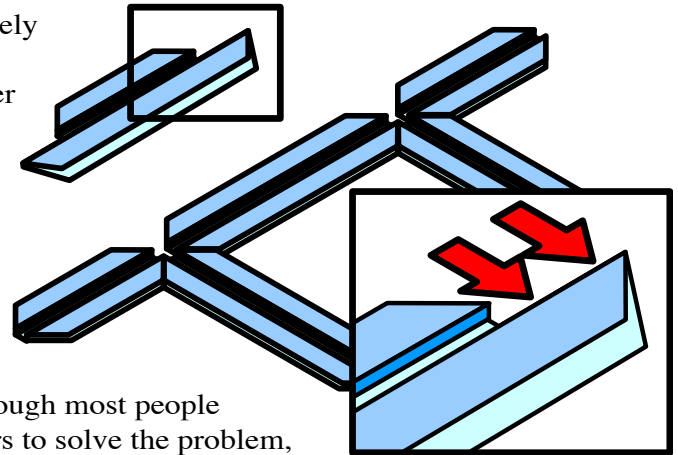
Given the inherent resiliency of paperboard, the degree of misalignment, the height difference between the surface of the Tuck Panel and the surface of the Tuck Flap is not significant, nor is it generally noticeable to the carton user. However, two important transformations have been accomplished. First, there is minimal chance the slit lock is not cleanly cut through and separated, as the vertical shearing effect of the counter profile on one side of the knife, and the dense ejection material on the other, ensures any retained fiber is completely severed. This is a critically important attribute as the slit lock is the key to the success of the entire carton. Secondly, locking is completely eliminated, which will prove to be a productive advantage in handling and finishing the carton.



To completely eliminate any chance of locking, many professionals deflect the other end of the carton, and obviously the deflection is in the opposite direction. This is accomplished in a similar fashion, however, at this end of the counter, the profile of the counter traces the underside of the slit lock knife, with the fiberglass counter on the other side of the knife being skived away as normal. *See left.* The dense ejection material is now added to the upper side of the knife in the steel rule die, with a slightly softer rubber than normal added to the underside of the slit lock.

## INNOVATION

The Deflection Technique is rarely used, but it is a very powerful technique, which provides the diecutter and a carton designer with some innovative performance options. Deflection can be permanent, in other words the surface misalignment is a feature of the finished carton, or the deflection can be temporary, where a cut is opened and then closed in diecutting! This is very important when a design has some critical internal locks or slits, whose performance is critical to the finished design.



Getting back to the locking problem, although most people attacking this issue use fiberglass counters to solve the problem, it is possible to accomplish the same technique when using Matrix Strips. *See above right.* When using Matrix, instead of cutting the matrix on a Hand or Bench Mounter Matrix Cutter, which angles each end of the matrix strip to enable it to nest with other matrix strips running at right angles to one another, the strip is fitted with extensions on both ends of the strip. The opposite side to the deflection support piece can be trimmed off before the matrix strip is attached to the steel rule die, *see left*, or it can be trimmed off after the matrix strip has been transferred to the cutting plate.

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