4 Channel Width Rationale

Title: New Guidelines for Improved Channel Scoring Performance.

ProTECH Wagner Technical Resource

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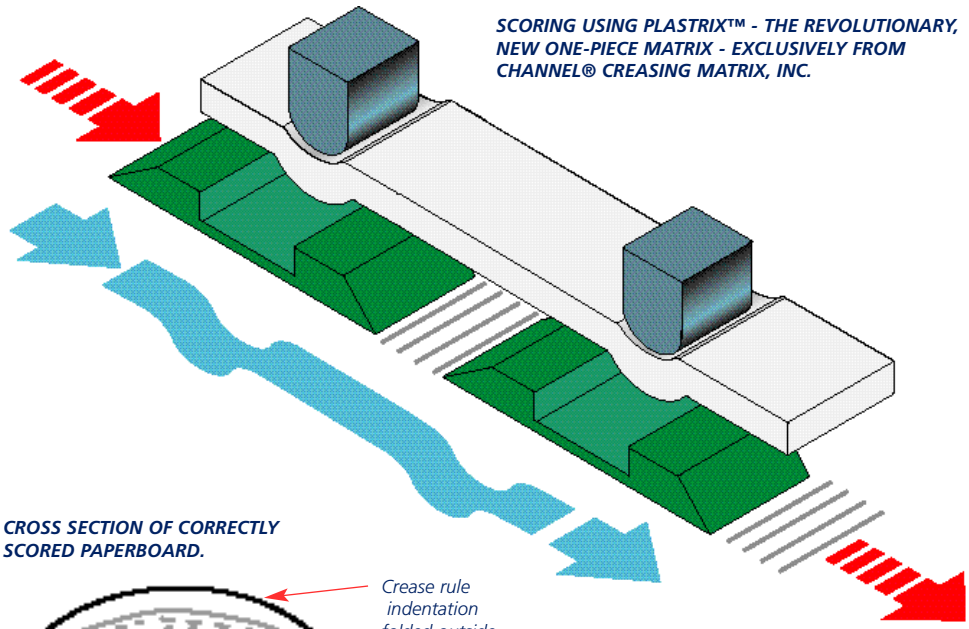
by Joe McDowell, Channel® Creasing Matrix, Inc.

For many years we have perceived that the logical theory of channel width, when forming a creasing bead, should be 2 times the paper thickness plus the crease rule thickness. When looked at in a logical sense this is the most reasonable way to form the bead. After all you do need to accommodate for the paper on both sides of the crease rule and of course the crease rule itself. This should give you that nicely formed crease and keep the bead consistent. The key word here is should!

There have been years of research on this subject, with none more significant than that done by the Boxboard Research and Development Association (BRDA). Their research has shown that there is a correlation between the thickness of the board and the width of the channel in regard to a ratio factor. What this is saying is that there is a direct effect on the board in relationship to the width of the channel used as the female and the crease rule used to form the bead. Their findings were that in a with-grain/corrugation the ratio should be 3 to 3-1/2 to 1. In other words for every thousandth thick the board is, you would need to multiply the board by 3 up to 3-1/2 times and that would equal your channel width. This would of course change your crease rule dimensions in thickness. However, to figure out the channel width using this method would require quite a bit of variation in crease rule inventory. Therefore our industry has adapted to using formulas that bring us close to fitting into these ratios.

As mentioned, the most common channel width formula out today is the 2 times the board thickness plus the crease rule thickness equals channel width. Some time in the 80's came a formula that says 1.500 times the board thickness plus the crease rule width equals the channel width. Most recently another variation to the formula has been worked out to keep you within the ratios, this formula is 1.750 times the board thickness plus the crease rule thickness equals channel width. You will notice in the second two formulas that the paper is not compensated for in its original form, but will be slightly compressed (pinched) at the area of critical distance (the area where the inside tops of the shoulders, of the channels are closest to the radius on the crease rule). To briefly explain the need for this "pinch" you must realize that a crease or bead is not simply an impressed line in the paper. Instead the crease is a line in the paper where the die cutter has placed a male and female system to mold the paper by delaminating the material where the bead is. In other words the job of the crease rule is not simply to put a round impressed line down the sheet, but to actually force the material into the channel while pinching it at the points of critical distance so that the material in between will stretch on the top and bottom layer and the layers in between will actually delaminate from one another (This of course is for the paperboard material and not corrugated). When formed properly a crease bead will allow the majority of material to be forced into the inner box when folded and the outer skin/layer to be folded over without too much stretch. This creates less stress on the material as well as the inks and thus you will get little to no cracking on your creases.



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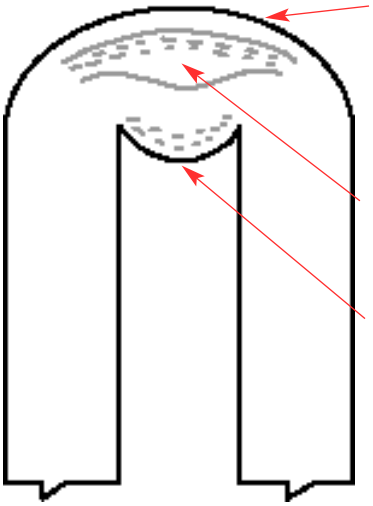

As a matrix supplier we run into many cases of companies having trouble with creases that either crack or are ropey (do not fold squarely) this would be eliminated if die cutters would consider the ratios between the material and the channel. For more information on scoring and Channel® Creasing Matrix, Inc. products, contact Wagner Die Supply.

For more information, please contact us at:

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