PART 3

BANISHING THE 'IRRITABLE DIECUT'

Richard Putch of Dicar wraps up his series on common diecutting issues that affect productivity, quality and anxiety levels.

Things have finally quieted down a bit. Well okay, not really, but it's time to finish up my list of the 10 most common diecutting issues anyway.

One of the first things I find when I try to determine the top 10 issues is that everyone has their own top 10. Most people can agree on about seven, and then the last 30% are spread out and you end up with something more like a top 14 or 18. If one of your top 10 didn't make the list I apologize, but then maybe that one is worthy of a column all to itself.

So, here are the rest.

Fluctuation of Print Registration

There are a myriad of things that can cause print registration issues. One issue that operators may overlook when fighting floating registration is the impact (no pun intended) the diecutter can have on this.

Gear train backlash may be one of the largest contributors to inconsistent print registration. Complex gear trains link feed rolls, transfer systems, printing and diecutting cylinders through numerous mesh points. Even the slightest bit of backlash can be amplified throughout the train to create substantial differences. When a large area of horizontal knife, such as the lead edge, penetrates the board and anvil, the speed of the die drum or anvil cylinder will vary slightly. This variation in speed is then transferred through the gear train and causes the in-process sheets to continually speed up and slow down. The more wear in the gear train, the more noticeable the registration fluctuation.

Older diecutters with smaller frame footprints can also suffer from a tug-of-war

Editor's Note: In Part 1 of this series, in the September/October issue, Rick Putch addressed the negative effects that broken lead edge rule, cracking scores and poor score definition can have on diecut quality and productivity. He also discussed some possible ways to cure these conditions and relieve the associated anxiety. In Part 2, in the November/December issue, he continued working his way through the top 10 most common causes of frustration on the diecut line by looking at the efficient stripping of slots, design flaws from transferring jobs from flatbed to rotary and poor diecutting aesthetics.

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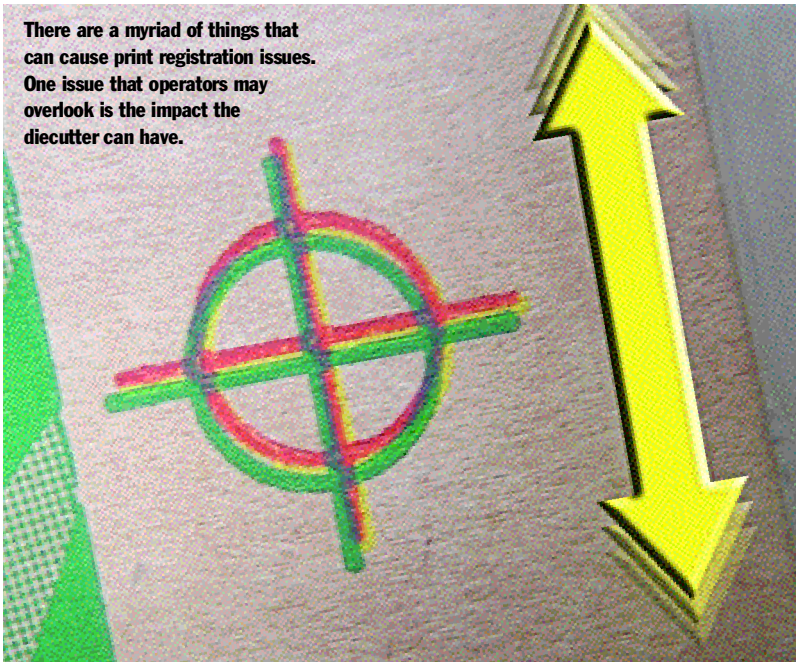
between the diecutter and the last print station. If part of the sheet is in the print section or gripped by pull collar shafts as the lead edge is cut, the sheet can be pulled back causing the appearance of a print plate mounting problem. How many times have we seen an operator re-mount the printing plate or add more straps or tape in an effort to resolve this problem, only to have it persist?

Fortunately, many of the newer presses have longer frame footprints, dwell or transfer sections between the last down and the diecutter and independent drives that eliminate or minimize gear trains. If, however, you have to contend with an older press — there are plenty of them still out there — here are a couple of points to keep in mind.

- Maintain the gear train. Keep the oil clean and changed. If you rock the die drum or anvil cylinder, with the power off and the gear train brake released, and you hear the gears clatter throughout the machine, you'll probably want to look at replacing some or all of them.
- Watch your die impression. Only use what is necessary to produce a clean cut. Too much impression and the die and anvil will fight to control the speed sending shock waves through the gear train. Not to mention all the other issues over impression can cause.
- If possible, mount the job on a bias (at an angle less than 90 degrees of the centerline of the drum). This requires a little more preplanning and attention to detail, but the results can be very favorable. When mounted this way only a small portion of the rule is in contact at any time. Unlike conventional dies where an entire row of horizontal rule impacts the anvil at the same time.
- Free indexing anvil bearing cylinders, such as the Dicar Equalizer, are also effective at helping to control this issue.

Poor Product Ejection

If the diecut blank doesn't separate from the die immediately bad things happen, and with the speed of today's diecutters, bad things happen fast! The ejection rubber, the die design and friction are the major factors that affect product ejection. The vacuum created between the die board and the blank as it is ejected can also play into the process. This may be more of an issue with platen diecutting, but it can, to some extent, affect rotary as well. Especially if the lead edge of the blank does not immediately separate from the die as it exits the anvil nip.



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The type, placement and condition of the rubber are critical to proper ejection. Whether at the machine side or in the die shop, the rubber should be separated and properly marked for type and usage. Often you'll see a box of rubber by the machine side from which the operator selects pieces to replace rubber that has fallen off, or to add if he thinks he needs more somewhere. If you're lucky he may pick the right color. Is he selecting the proper rubber from a mix-n-match box? Who knows?

Placement of the rubber is critical as well. Of course it must be placed to correspond with the diecut design. However, placement in relationship to the steel rule is also very important. Too far from the rule and there won't be enough support to form a clean cut. Too close to the rule and there won't be enough room to allow the foam to expand when compressed. Also the friction between the rubber and the side of the rule can slow the response of the rubber

and therefore the ejection on the blank. Rubber that has been cut using a CNC controlled waterjet to specifically meet the shape and requirements of the die may offer the most consistent fit and performance.

Nicking, which can be an article on its own, can also affect product ejection. We often see release problems related to hand nicking of the die. The nick may be too small, too large or misplaced, all of which can cause a multitude of problems in the diecutter or downstream. When a die is nicked using a chisel it will create a burr on the rule referred to as a "fishhook." If this is not removed it can slow the ejection of the blank. Worst case, it can catch and hold the blank in the die.

The general design of the die can also cause problems here. Sharp angles, points or small punches in close proximity to one another can cause release issues. A good designer will design around most of these.

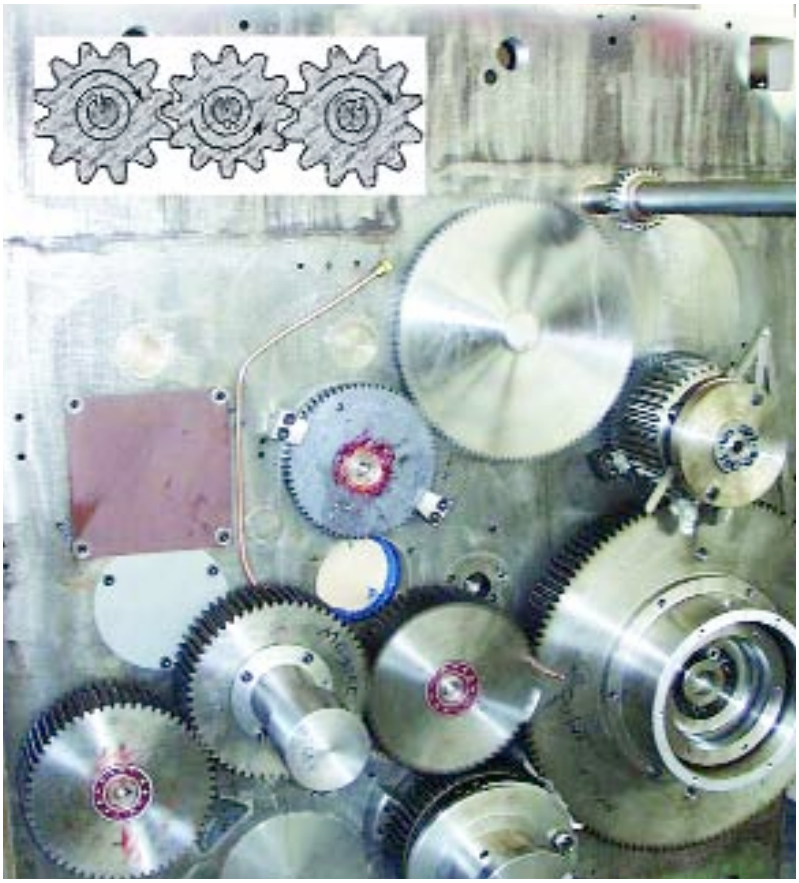
Loose Score and Knives

Most cases of loose scores and knives can be directly related to misuse and poor die maintenance. However, errors in the manufacture of the die can certainly have an influence as well.

Over-impression, which is often used to mask other issues, is at the root of many problems. Undue force placed on the rule causes it to begin moving inside the board. Each movement erodes a tiny bit of the shell until finally there is not enough shell left to support, or secure, the rule.

When this happens, you'll begin to experience problems holding size, and scores may become inaccurate or have poor definition. If the wear becomes excessive the rule may break or fall out altogether.

Keeping the anvil covers trimmed and/or rotated will help with the over impression issue. A smooth, even anvil requires less pressure to function properly. Also, it's important that the die is pulled down tight against the drum everywhere. Any place that the die doesn't sit firmly against the drum will allow the shell to flex from the pressure of each impression. The constant flexing can work the rule loose or cause it, or the shell, to crack.



Gear train backlash may be one of the largest contributors to inconsistent print registration.

It's simple to check for a tight die. Just take an Allen, small wrench or brad hammer and lightly tap the shell between and around the bolts (which you have put in every hole... right?!) being careful not to hit the rule. You'll quickly learn the difference between the solid sound of a tight die and the wooden sounding knock where it's loose. If you find a loose spot, make sure the bolts around it are properly torqued. If they are, you may want to check the shell or drum for damage.

These are not by far the only things that will cause loose score or rule, but perhaps the most common and easy to spot.

Die Bolts

Die bolts aren't really a diecutting issue per se, but they can lead to many. They play an important part in the quality of the products we produce and welfare of our tooling, yet we often choose to ignore them until we simply can't anymore. The rules governing die bolt usage are

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perhaps the most basic. Maybe that's why we choose to overlook them. Paying attention to the smallest details may eliminate many of your larger issues. Keep these few points in mind.

• Make sure the bolts meet the OEM specs and replace worn bolts immediately. If possible, buy your bolts from your die supply vendor. If you get them from Wal-Mart or TrueValue, they may be too hard, or too soft and cause too many problems.

• If you're buying a new machine be sure the die drum has die bolt inserts. If they aren't standard, they're worth a reasonable upgrade fee and can greatly reduce the down time necessary to re-drill and tap stripped holes.

• Start each bolt by hand, make sure the threads engage, then drive them home with an air wrench. It doesn't help your Lean Manufacturing effort if you spend the time you save removing broken bolts or re-tapping stripped threads. Many operators still start the bolts with the air wrench. Break the habit, before it breaks a bolt.

• If you break a bolt or strip a hole you may not be able to replace it immediately, but do it as soon as you can. Even if you have to make special time for it. In the meantime, don't just go to the next hole in the die, shift it over one hole so you can still get a bolt in every hole. Also make sure the broken bolt is below the surface of the drum. If you're running into more broken bolts or stripped holes than you can shift the die for, then perhaps it's time to repair them.

So there we have the 10. I hope they'll help you in your day to day operations. Some may have been a bit basic, but so often we overlook the basics and try to solve problems from the top down instead of the bottom up.

Remember, the first rule of troubleshooting always starts with the simple and works toward the complex. You may find you save a lot of time, aggravation and Advil this way.

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