

CHAPTER XVIII

BACK SQUIRTS

How Can I Eliminate Back Squirts?

QUESTION: How can I eliminate back squirts on a linecasting machine? The lockup seems perfect, and I believe the metal is at proper temperature. Would it be possible that the mouthpiece is warped? — C.J.R.

Poor Lockup Most Common Cause

HARDING: Poor lockup is the most common cause of back squirts. If the mouthpiece is warped, this will show in a proper lockup. (See *To Test the Lockup*, page 177.)

Hot Metal or Mouthpiece

LOOMIS: The second most common cause of back squirts. Keep the metal under 550° F. (See *Temperature of the Metal*, page 146.) Metal in country plants often runs above 600°, and metal at this heat does not solidify properly at the cast.

Metal on Back of Mold

LOOMIS: This also is a very common cause. Many country shops operate with no back mold wiper at all, and the molds accumulate a heavy layer of metal. Pull out the disk and look. If there is metal on the mold, take it off with a brass rule and mold polish. Also see *What to Use on Back Mold Wiper*, page 142.

Cold Metal or Mouthpiece

HARDING: Cold metal also will cause squirts. The pot can be tested with a sheet of folded newsprint. Hold it in the metal while you count three slowly; the paper should be a light brownish tint. To test the mouthpiece, which is supposed to be 490°, hold the smooth side of a slug tightly against it; it should start to melt in one minute. Or crowd a long metal sprue into a mouthpiece hole; it should melt in ten to twenty seconds.

Sometimes this trouble happens when the operator has turned the mouth-

piece low to set big slugs and forgotten to turn it back; sometimes it comes from drafts.

Metal Pot Too Full

HARDING: If the pot is too full, metal will drip from the mouthpiece as the pot rocks forward and prevent a clean lockup.

Dirty Plunger or Well

HARDING: If the plunger becomes dirty enough to stick momentarily, it will rise as the pot goes forward, raising the plunger roll off the cam. Then the plunger gives way, and the short drop forces metal out of the mouthpiece before the lockup. This solidifies and causes a squirt on the real cast.

Tight Plunger or Dross Ring

HARDING: A tight plunger will do the same. Rub tallow or metal flux on it occasionally. If a dross ring has formed, scrape it out as told in *Dross Ring in Well*, page 157.

Plunger with a Short Stroke

HARDING: A plunger will work better on bigger slugs if it has a longer drop. A plunger that drops well down into the well has better suction when lifted, and tends to pull the metal back into the throat away from the mouthpiece.

A plunger with a short, spongy stroke may cause back squirts.

Weak or Broken Pot Spring

LOOMIS: Occasionally a pot lever spring will lose its compushency; if no other defect shows up, it does not hurt to try a new spring; they're inexpensive. Also it is surprising how often, when you are doing this, the old spring will fall apart once you get it out of the machine. I spent two hours once cleaning squirts out of a machine where everything was perfect, only to find that the pot spring was cracked on the side I couldn't see.

Worn Vise Shaft

HARDING: Only recently has provision been made for oiling the pot leg bushings. It has always been advisable to oil them, however. The friction may seem little, but it will wear both bushings and shaft enough to cause a squirt. In such a case, get a vise shaft and bushings. In an emergency, you can push the shaft one inch to one side and get new bearing surface.

Excessive Recasting

HARDING: Any machine will tend to squirt on recasting big slugs, for the greater quantity of metal carries much more heat to the mold. Do not cast over three 12-point, 30-pica slugs per minute unless you have a mold-cooling device. When the mold gets too hot, the metal will run back out of the slug when the mouthpiece pulls away, and the next cast may be a squirt.

LOOMIS: Watch a gas mouthpiece. It should not be necessary to run the flame over an inch high at the most. If you let it run away it will often overheat the mouthpiece and produce squirts.

Pot Leg Adjusting Screw or Pot Leg Cap Screw Loose or Pot Leg Cap Broken

HARDING: One of the four adjusting screws or one of the two cap screws may work loose. Loosen the nuts one at a time to try all the screws. Turn the screws up snug but not hard, or you'll be sorry. The pot leg castings are comparatively weak.

Pot Cam Roller Bearing Broken or Pot Leg Bushing Cracked or Broken

HARDING: Either of these causes will produce squirts.

Pump Stop Bracket Set Too High

When the pump cam wears and allows the plunger to rest low enough to shut off the holes in the sides of the well, an oversize cam roll should be applied. This may cause the pump lever lug to be poised too far above the pump stop lever. Then when a loose line is sent in, the pump lever will make about an eighth-inch stroke. This will push a little metal into the mold, and this will cause a squirt when the next line is sent in. Slot the holes in the pump stop bracket and raise it until there is barely clearance. Adjust the stop.

Pot Lever Rubs on a Cam

The pot lever must be adjusted laterally to cause it to run free of the three adjacent cams. A pot lever that has contact with a cam at the time of the cast will cause a squirt.

"After"-Squirts

HARDING: Sometimes metal drops from the mouthpiece as it backs away from the mold after the cast. When the pot locks up the next time there will be a squirt. After-squirts are caused by dirty plunger, tight plunger, short stroke of the plunger, metal pot too full, pot balance spring too stiff.

When the stroke of the plunger is short, there may still be a little down pressure on the pump as the metal pot backs away.

Lug on Crucible Broken Loose Tie Rod

HARDING: W. M. Gage of Hillsboro, Ill., found one of the lugs on the crucible broken. He also points out that a loose tie-rod can cause a poor lockup. The tie-rod passes through the right-hand cam shaft bracket and is threaded into the center column. It should be set with little more than finger pressure.

Screws Left out of Pot Top

LOOMIS: I discovered that one screw omitted from the front of the pot top allowed the crucible to work up and finally to squirt consistently. If you have to omit a screw, omit it at the back.

Shallow Cross Vents

HARDING: H. H. Canfield of Watertown, N. Y. writes that shallow cross vents will contribute to squirts when changing from long to short measure.

Cross Vents Have Too Big an Opening at Bottom

LOOMIS: If the vents allow a sprue more than about $\frac{3}{4}$ " long when the mold is cool, you may get a squirt from excessive drip. See *Venting the Mouthpiece*, page 178.

High Spot in Throat

HARDING: A contributor to *The Graphic Arts Monthly* says that he has found a high spot in the throat just inside the mouthpiece that apparently caused squirts.

LOOMIS: This is hard to understand. It certainly could cause a bad spot in the face of the slug, but as to squirts—well, I've seen some unbelievable things on linecasting machines. The contributor probably is right.

Loose Vise Locking Screw or Stud

HARDING: Harry C. Baller of Los Angeles suggests that a vise locking screw or stud may be loose, especially the right-hand, and cause squirts (this does not refer to mold disk locking studs).

Faulty Electrical Controls

HARDING: A faulty governor or electric thermostat may allow temperature variations that will cause squirts. A faulty rheostat may cause squirts.

Mouthpiece Does Not Lock up at Lower Edge

LOOMIS: I have put on a great many mouthpieces, and it has been my observation that a couple of years later they will show warp and will need honing — not too much but some. It also is true that invariably such a mouthpiece will be light on the bottom, and ragged as if there were tiny holes punched in it. This rather seems to come from the tiny amounts of metal that accumulate on the bottom edge of the mold and are there during lockup — not enough to cause a squirt, but enough to beat the mouthpiece in a little. Remedy: hone the entire mouthpiece until the bottom is at least fair.

HARDING: This is a common trouble on old machines. Look first to the mold posts to see that they are not sprung. Then check to make sure that the mouthpiece adjacent to the cross vents, was not swollen by the use of a chisel when venting. The red lead transfer will show this. See that the metal pot does not rest too far back on the vise frame shaft. This would require that it rock too far forward before making contact with the mold. The mouthpiece would be carried past perpendicular before contacting the mold.

All too often it is found that a novice, dressing the mouthpiece with a file, has taken off too much from the lower edge.

Sprung Mold Posts

LOOMIS: Very often you will, on testing with red lead, find a mold that tests fine on the upper half but not at all on the lower half. This is likely due to sprung mold posts. For some reason they always seem to bend backward. It is therefore imperative that you check the mold before honing. This is easy. Put in a liner — preferably a good liner — and pull out the mold slide and look at the back of the mold. Both base and cap of the mold should be flush with the liner. If one protrudes, it usually indicates bent posts. The best way to straighten them is to take off the mold, knock the pin out of the post, lay the post on a steel surface, and hammer it straight. Test as before, with the liner. Get both ends right. You may find the post broken. You can operate without it, but send for a new one and a new pin.

HARDING: Run a straight-edge over the face of the mold to determine the extent of the trouble. If more than one or two thousandths of an inch, the small pins should be driven from the mold posts and new posts applied. The posts may possibly be straightened but this is work to be undertaken by a competent machinist.

Mold posts *may* be straightened in a vise. Protect the jaws of the vise with brass. If the posts are sprung forward, put an extra one-point brass rule in front of the cap and one behind the body and squeeze the mold. Work carefully. Test often.

Warped Disk and Mold

LOOMIS: After considerable thought I have concluded that I have never seen a mold warped badly enough to cause squirts. I know that the mold cap of a recess mold will warp and cause trouble on ejection, and I have seen a mold base knocked out of square by repeated hammering with the ejector, but I am slow to say a warped mold causes squirts.

I brighten considerably, however, when you mention warped mold disks. Most disks are warped, especially on gas machines, and some so badly that you cannot make a mold lock up without using shims. For more on warped disks, see page 127 and page 214.

Molds Ground Down

LOOMIS: Much more serious is the continued use of mold polish on the back mold wiper. After advocating oil and mold polish for many years, I had it proved conclusively to me that mold polish does contain an abrasive. It is very mild, to be sure, but continued every-day use on a back wiper will scour out a path in the back of a mold. The one I saw, when we finally got it off, had been ground down about .015"!

I use mold polish; you can't get along without it—but not on the back wiper.

Excessive Tin; Pot Lever out of Adjustment; Jet Marks on Slug Run Over Edge

The Imperial Metal Company in their excellent booklet points out these three additional causes of back squirts.

Machine Back Squirts When Changed to Short Measure

QUESTION in *The Graphic Arts Monthly*: This machine switches from news to the 14- and 18-point and the 8-point on 30 picas, a great number of times each day. When swinging back to straight matter, the mouthpiece has to be wiped off each time or it will back squirt. Can I expect this machine to change back and forth without trouble?—M.L.M., Lafayette, Ind.

HARDINGS You have caught me with an old question that is presented frequently, and with which, I must confess, I have had little experience. I have often wondered why, and my only explanation is that I always have been careful to keep the lockup good and temperature under control, and therein, according to the authorities, lies the answer. It is true, however, that there are obscure causes that sometimes baffle us. One of the most common causes of this particular trouble is faulty liners.

LOOMIS: The lockup should be checked, for it is possible, as we have said before, for a poor lockup to operate all right on thirty picas but cause trouble on short measure.

However, I agree with Harding that the most common cause is faulty liners. They may be either bent or shaved down. A liner hit with an ejector blade should not be used at all unless you file around the slot and the guide-piece until the liner goes in straight and fits down flush with the mold. With careful filing, that can be done, but it is good practice to order a new liner. Liners get shaved off on the back side of the mold disk because they are tamped in too hard with the screwdriver, and then the back knife, which may be set tight anyway, trims them down. I have found that any liner that measures under .873" at the casting end should be discarded. If you do not have a micrometer, put the liner carefully in the mold and see that it is flush with the mold on the outside. Then pull out the disk and examine. If your fingernail detects more than a perceptible difference in height between the liner and the back of the mold, it may well be too low. A new liner measures .875"; some measure .876" to allow for wear.

A sure way to tell if your liner is undersize: put in a new liner carefully and try it. If it works all right, then it is safe to toss the old liner in the junk-pile.

Cleaning up a Back Squirt

HARDING: Open the vise, pull out the mold disk, and dig out the metal, using with caution the pot well hook, an old screwdriver blade for prying, and a hammer for places where it is absolutely necessary. Do not touch the molds or back knife with anything harder than brass.

With a little practice you will get so a little tapping and a little prying will loosen the worst-looking squirt there is. Turn the disk all the way around and watch inside the flanges; sometimes it will be up under the back knife; sometimes it will be around the ejector guard. The old ejector guards are easily removed by the two screws on the right side.

Get all metal out and see that the disk turns freely.

LOOMIS: I strongly advise against removing a mold to clean up a squirt. In fact, *I do not countenance removing a mold for anything* but necessary repair work or to shim it up to meet the knives. A squirt can be cleaned up without taking off a mold.

If you have a dummy mold on the disk, it will sometimes facilitate metal removal, especially from under the back knife, to take out the dummy—but not a mold. Take off the back knife rather than a mold.

LINECASTING OPERATOR-MACHINIST

Compiled by

EDWIN B. HARDING

Professor Emeritus of Journalism and Printing
South Dakota State College

Edited by

NOEL M. LOOMIS

Linecasting Machinist
Minneapolis, Minn.

STOCKTON BOOK PUBLISHERS . PITTSBURGH, PENNSYLVANIA
