

How to Avoid Breakage of HP TIPS on Lead Slug Ejector Punches (as used in PF-1-SP, PF-1-HP dies)

Point Forming dies with synchronized length ejector pins are used to make lead airgun slugs, ULD-Tip jacketed or lead bullets, Pin-Point bullets, and hollow pointed bullets where the HP is created during the point forming process.

The ejector punch diameter sets the size of the meplat, or flat at the end of the bullet. From this ejector punch diameter, a hollow point forming tip can be machined. This tip generally will be at least .020-in smaller than the ejector diameter in order to leave a minimum of .010 tip wall thickness around the hollow point hole. Otherwise the end of the bullet would be too fragile to withstand handling and loading.

The ejector is "synchronized" with the individual die cavity depth so that its length is carefully hand fitted and comes to within four decimal places of exactly meeting the end of the die cavity, so it will seal pressure at the tip of the bullet, and not project down into the bullet at full diameter, or be slightly short of the bullet tip and allow a "pipe" of lead to extrude beyond the bullet tip (up the ejection pin hole).

This design allows a lead bullet to be completely formed in one step including weight adjustment with bleed holes in the point form die, setting the diameter, weight, length, and base shape, and can also make a flat tip or a hollow point at the same time. The hollow point is made by the previously referenced "tip" turned on the end of the ejector punch.

The small tip will withstand a great deal of direct On-Axis force. If a flat ended lead core that fits closely to the bore of the die is pressed into the die and against the HP tip, the lead is penetrated and a hollow point cavity forms around the punch. All the force is straight against the axis of the punch with little or no side force to bend the punch tip.

But if the lead core is much smaller than the caliber being formed, the core can flow up one side of the ejector tip before it fills in the other side. During this initial flow of lead, side torque is applied to the fragile tip, forcing it to one side while the main part of the ejector is held straight. The punch tip is not big enough to withstand tons of side pressure, and it snaps off.

The solution is to use a core that is closer to the bore size, so that lead will begin to flow more evenly around the tip as soon as enough pressure is applied.

The tip can also be forced to one side and broken off if the end of the lead core is not reasonably flat and square to the die axis. If the end of the core is angled from being cut off the spool of lead wire, the wedge shaped end can easily flow up one side of the little hollow point tip before it fills in the other side. This will snap off the tip by side force, just like the undersized core fluid dynamics effect.

The solution is to use a flat ended core, such as one that is pre-swaged or has been run into the same die using an ejector that has a broken HP tip and is ground flat across, then running the slug through the same die again with the "good" HP ejector installed.

Naturally this would be done in a group run, making all the slugs in a pre-forming run and then changing the ejector to run them through again and create the hollow point. This increases production time so it is primarily useful for personal use, small runs, or as a temporary measure until a way to produce flatter ended cores is obtained.

The issue may be caused by a combination of both uneven core ends and undersized cores, such that either amount by itself might not snap off the hollow point tip, but the two factors working against the tip at the same time will cause enough side force to break it. Pre-swaging the cores through a core swage die will almost always solve this issue if the swaged core diameter is within a few thousandths of an inch of the point form die caliber.

Alloy lead or scrap lead with bits of harder material, grit, copper, and other debris may also result in snapping off the HP tips. Use only pure Bhn 5 soft lead such as Corbin's 99.95% pure lead wire.