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## HSLA Steel: Solutions to Its Unique Challenges

The use of High Strength Low Alloy (HSLA) steels has increased exponentially over the past decade. This has been driven by the desire to manufacture lighter, stronger and more durable products. This is most noticeable in the automotive industry. HSLA materials themselves come in a wide variety of functionality to satisfy the ever-emerging market requirements. Although HSLA steels may sound like the best material for the job as they are light and durable, they do come with their own unique challenges.

Some challenges one may face when piercing HSLA materials would be:

- Premature tool wear
- Chipping
- Head breakage
- Tip breakage
- Galling



To fix some of the problems commonly seen while working with HSLA steel one must first analyze what is actually occurring. Tool wear is commonly seen when using HSLA steel. This can occur due to galling, micro fracturing, exceeding the tensile strength of the tooling, or maybe just too large of a volume of hits. To determine the real cause of failure, evaluate the punch tip under a high power scope. The results of the evaluation will best assist in what is needed to improve tool life. Once you have determined why the tool is failing you can move forward with selecting any or all of these alterations to improve tool life.

### Options to Improve Tool Life

Improve Surface Finish  
Add or Increase a Tip Shear

Improving surface finish or adding shear can also result in a longer lasting tool. By reducing the amount of drag or force required to strip the punch you have effectively reduced the amount of pressure put on the surfaces of the punch that commonly cause failure. The same could be said about shear. The reduction of tonnage can result in improved tool life.

[Click here to learn more about surface finishes.](#)

#### Remove Ejector Components

##### Use Alternate Tool Steels

If you have determined that the ejector components are causing the failure you could remove the ejector components or use alternate tool steels. Removing the ejector components may result in slug pulling which could be remedied by using slug retention in the die button. By removing the ejector components you have removed the weakest portion of the punch that commonly cracks in the tip or even causes the head to break off. If the ejector is required, changing to tougher tool steel can also improve tool life.

#### Combining Tool Steel and Coatings

The last and most commonly used solutions for improving tool life are tool steels and coatings. Tool steels and coatings can be used as separate options or used together to best maximize the functionality of both alternatives. Tool steels such as CPM M4 and 10V have greater wear resistance properties and are typically tempered to a higher Rc (around 62-64). These materials are commonly used when excessive tool wear is evident. If you are seeing chipping or head breakage, the use of tougher steel such as CPM 3V may be a better option. Whenever you are selecting a tool steel, keep in mind that you may be solving one problem but causing another. This is why combining tool steel with coatings is a common practice. Coatings such as [Optima®](#) and [OptimaX](#) provide surface enhancements that will improve tool life and wear resistance.

[Click here to learn more about coating options.](#)

As is the case with all tool wear, evaluating the root cause of the failure is the best and most effective way to improve your tool life. Keep in mind that one solution is not the best solution in all applications. Different material and grades of material require different approaches and solutions. A thorough investigation of the tooling failure up front will provide the proper information to determine the best alterations to maximize your run time.

**Consult your local sales engineer or the Impax Sales Desk at 800-944-4671 for further recommendations and assistance.**

## CUSTOMER PROFILE

Custom tooling solutions from Wilson Tool help 4 Star Tool & Die evolve.

4 Star Tool & Die in Wichita, Kan. builds tools, dies and other metalworking solutions for customers ranging from major worldwide manufacturers to the guy walking in off the street looking for a part to repair his lawn trimmer. A true job shop with more than 30 years of experience, no job is too big or too small for Ron and Shawna Miller and their team.

The company was started in 1980 by Ron's father and four partners - hence the name 4 Star Tool & Die. By



You can't stop production to wait for tooling to show up. You need a reliable supplier who delivers high-quality products quickly and efficiently.

1997, through death and retirement, Ron's father, Ed Miller, became the sole owner of the business. Not long after, he offered to sell the business to Ron and his wife, Shawna.

"He approached my wife and I in the fall of 1999 and said, 'Well, I'm going to retire so you can either buy the business or find another job,'" said Ron Miller, owner of 4 Star Tool & Die. "It wasn't quite what I had planned years ago, but we decided to buy the business and try to make a go of it."

The business was founded on building class A dies, stamping dies, progressive dies, form dies... just about any type of die. However, over the year the economy and the industry has changed with the introduction of lasers and new technology so, like many other job shops, they've had to adapt to meet different needs.

"We still build dies, although few and far between now because the needs of the customer have changed," said Miller. "Today we do a lot of fixturing work. We make a lot of specialized tooling per customers' drawings."

For the past 15 years, 4 Star has used punch and die components from Impax® Tooling Solutions, a division of Wilson Tool, in their tool and die production.

"We'd used tooling from other manufacturers because we didn't know about Wilson Tool or Impax. When the offer came to give them a chance, we did and found out that their quality is every bit as good as they claim," said Miller. "After having dealt with other manufacturers, sometimes the quality is not the same as what's advertised. Impax has done a great job of delivering on that promise of quality."

But what has really made a difference in the way 4 Star does business today is the ability of Impax Tooling Solutions to provide high quality custom solutions.

Purely by chance, 4 Star's sales person from Wilson Tool, Scott McMillan, happened to be visiting the shop one day when a customer submitted a truly unique request, which Miller shared with him.

The customer was looking for a punch and bushing that were very non-conventional and unlike anything that would come close to a catalog item - something they had developed for their own use.

McMillan looked at the request and thought that it was something Impax Tooling Solutions could handle, so he asked Miller to give Wilson Tool a chance to quote it.

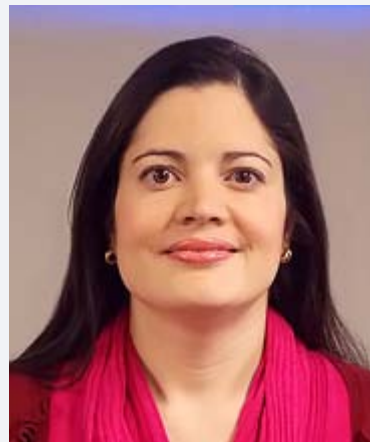
Wilson Tool offers same-day service on the highest quality tooling systems available anywhere. Tooling for punching, bending or stamping - we'll get it to you when you need it.



[HP Accu-Lock Retainers from Wilson Tool](#)

## Faces of Wilson Tool

Jennifer Rondon  
*Impax Sales Desk Engineer*



Years at Wilson Tool: 6 months

**What is your favorite aspect of your job?**

My favorite aspect of the job is that I learn new things every day about our products and the industry. I really enjoy working with the Impax group because everybody is willing to

Miller sent the electronic file to Wilson Tool's sales desk and engineers, which came back with a solution and a quote the next day.

"The price was very reasonable, so we went ahead and placed the order," said Miller. "It came in on time with the same top-notch quality as always and our customer was very pleased."

The ability for 4 Star to partner with Wilson Tool on custom orders like this has changed the way they do business.

"It's opened up new doors for us as far as how we consider building a tool," said Miller. "We're a small shop, so we don't have all the resources the much larger shops have."

Previously, if 4 Star received an order for a tool or die they could not produce in-house they would work with several local shops that provide services like wire EDM, CNC lathe or anything they couldn't do on their own.

But according to Miller, that usually required the company to rely on several shops for a single job. The process meant that 4 Star's lead times on custom orders were not very competitive.

"Now, I can take that job to Wilson Tool, which has big facilities and big capabilities and can provide a turnkey solution that we'd have to rely on several shops for otherwise," said Miller. "So the turnaround is usually much quicker than getting it done locally."

While not every custom job is a good fit for Impax Tooling Solutions, Miller values the ability to work with a partner that not only provides high-quality tooling, but one that understands their business and is able to offer valuable insight and turnkey solutions.

"Scott has really been a champion for us at Wilson Tool. He's very involved in making sure that we're being taken care of and serviced," said Miller. "And Konnie Helwig at the sales desk, as well as the engineering team, do an unbelievably good job of making sure we get the right solutions for ourselves as well as our customers."

help me when I have a question or concern. I also like the collaboration among all the Impax employees. Everybody helps each other and works their best to serve the customer.

**What do you enjoy doing in your free time?**

I like traveling and seeing new places. I also like eating good food and visiting new restaurants.

**What is something that people would be surprised to learn about you?**

I have an 8-year-old brother.

**If you had to eat only one food item for the rest of your life, what would it be?**

That would be cruel for me since I like variety, but I would say lasagna.

**Where is the most interesting place you have been? Why?**

The most interesting place that I've been is Anne Frank's house in Amsterdam (The Netherlands). For those who don't know who Anne Frank was, she was a Jewish girl that wrote a diary about her life and experiences hiding during the German occupation of the Netherlands in World War II. The house is currently a museum that is opened for tours, you can go inside the house and see the rooms where the family was hiding, they also show pictures and artifacts that they used at the time. After reading her diary when I was in high school, it was very interesting to me to be in the house that she wrote about. It was a heartbreaking experience to see how they lived for a long time to try to survive.