

DIY slippery surface technology

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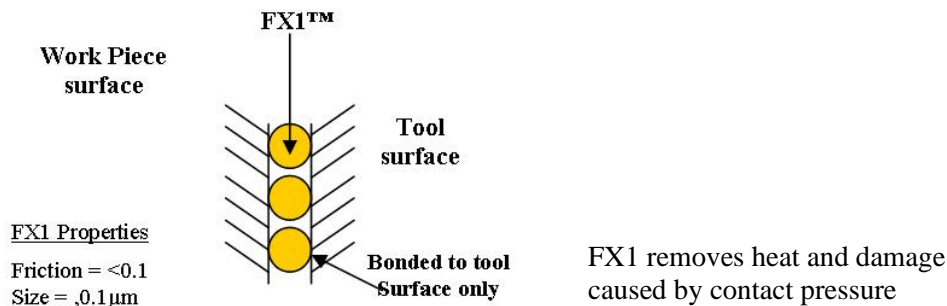
When an industrial process is developed, its ability to resolve existing problems simply may not at first be apparent. Protecting presswork tooling and machinery from the ravages of friction are examples. “Pick-up and wear are normal process events”, it is said for instance, pick-up on raising dies is only a problem if you fail to polish the die often enough..

For some time, friction reducing surface treatments have been widely available: titanium nitride coating and nitride impregnation for example. Relatively few tools however are routinely treated even though raising dies, piercing punches and draw dies have all achieved extended lives. Certain tools do however, depend heavily on surface treatments for performance.

General reluctance to use surface treatments may arise for several perceived reasons.

1. Required production volume insufficient to warrant treatment cost.
2. Potential damage caused by high temperature processes.
3. Time taken by process.
4. No guarantee that improved performance will be achieved.
5. Concern that sampled product quality will not be maintained after treatment.
6. Shortness of time between sampling and full production.
7. Irreversibility of the process in the event of unexpected metal flow characteristics.

A new process for pressworking has evolved from established practice in another industry. The “new” advanced friction protection treatment differs from existing surface engineering processes in one appealing way; it is DIY. This avoids the need for sophisticated equipment and high temperatures. The process is FX1, a thin dense surface modifier, which is inexpensive, speedy and simple to use.



The surface engineering characteristics of FX1™ appear to satisfy many needs; the process is:-

- Highly cost effective.
- Low temperature, simple and “Do It For Yourself”.
- Semi- permanent protection against friction.
- Repeatable, having no affect on dimensional tolerances.
- Used with existing tools just as well as new ones.
- Used with other surface improving treatments such as titanium nitride (TiN).
- Compatible with many existing lubricants.
- Beneficial in reducing heat in press slides and bearing.

Selection of Results From Several Pressworking Applications						
Tool (Surface Treatment)	Material	No.of Parts	Fail Method	FX1™ Method	No. of Parts	Comments
Blank Punch	4.5mm CR1	100, 000	Wear	Dip	125, 000	Less side wear
Raise Die (TiN)	3.5mm CR1	60, 000	Flaking	Wipe	180, 000	1 mid life polish of main contact surface. FX1 reapplied to hot tool in press
Form Die	1mm CR1	4, 000	Pick-up	Wipe	60, 000	No pick-up, even with tool run dry
Pierce Punch	5mm HR4	6, 000	Breaks	Dip	10, 500	7mmhole = heavy punch stripping pressure
Prog. Pierce/notch (TiN)	1.5mm 304 S21 hard rolled	7, 500	Heavy wear	Via Lube oil	9, 800	Press load & strip distortion both reduced. Volume of lube oil cut back

This simple application of high technology can be demonstrated to aid innovation, allowing greater control of time and money.

Two West Midlands sheet metal component manufacturing companies use the FX1 surface process and willingly shared their experiences.

Dart Springs Ltd., located in West Bromwich is part of the Turnpyke group of companies and manufacture a wide range of components from coil springs to progressive sheet metal pressing.

Company Director Mr Jim McGregor commented that their first experience with FX1 was in the production of a small dome shaped component using CS70 steel strip 0.8mm thick.

“The problem was scoring and sticking of the metal as it was developed during the first raising operation. Beyond approximately 5000 parts, degradation of the forming die surface was such that splits during the second hit would be encountered. Repolishing stoppages of 45 minutes extended press time and increased costs.

Treating the raising die with FX1 produced significant improvements in tool performance. Complete call off batches of 30, 000 are now produced without scoring, pick-up or splitting.” Another application showed improved piercing punch regrind life. Oval holes 6mm by 8mm were punched through spring steel 0.8mm thick. The original regrind life had been approximately 3, 000 parts but after treating with FX1 the average doubled to 6, 000 components.

Mr. McGregor went on to say, “We now have the confidence to quote for technically marginal work that previously would have been too costly to produce. Lubricating oil usage has been reduced significantly, while reduced press tonnage and strip distortion are useful benefits. The automatic oiling system on presses has been reset to pulse less frequently now that FX1 is added to the normal lubricating oil. This has helped the bearing of a 55ton HME press which became very hot while using a fairly heavy progression tool. After adding FX1 to the lubricating oil, the press runs happily for an eight hour shift, the bearings becoming only slightly warm.

Note - FX1™ has since been replaced by FHBSM a third generation Fastex Surface Modifier*

Thanks to both contributors for their assistance

Contacts:- Dart Springs Ltd. & Wayson & Co. Ltd

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Reducing the use of consumable materials cuts costs and is consistent with our aim to exert a minimal effect on the environment.”

Wayson & Company Ltd. is a small pressworking company situated in the Kingstanding area of Birmingham. The Works Manager Mr Bob Pitt explained that his Company provides a specialist service to several industrial clients. They work closely together adapting process and method to fulfil project needs.

Mr Pitt remarked that FX1 was used on a draw die producing sleeves from 420 S45 stainless steel 0.8mm thick. The die required polishing at 8,000 part intervals to stop tearing. One treatment of FX1 extended the polish interval to 50, 000 parts. Subsequent polishes were accompanied by a reapplication of the surface treatment.

Mr. Pitt was very pleased with the versatility of FX1. “The greatest success so far was with the bearing shells on our 30 tonne Hercules C frames press. They became extremely hot during use and typically, after about 5 hours running were too hot to touch despite a good flow of oil. The bearings were removed, cleaned, treated and reassembled. We added approximately 5% FX1 to the dash pot oil providing a constant supply to the bearings. Since then the press has run all day every day and becomes only slightly warm.

We have put FX1 into the planned maintenance program for all 20 presses on site. It is the surface treatment of first choice and is applied to all new as well as existing tools”.

FX1 has extended the scope of surface treatment technology and simultaneously brought new application into consideration. Plant and equipment get a protection treatment that could help planned maintenance. Several manufacturers are finding benefits that they previously missed and a growing number of tools have been given an extended lease of life. Tool life increases were readily achieved while confidence trials revealed potential results quickly.