Vapormatt

White paper

Bandsaw processing by wet blasting

Introduction

Since the maturity of the Digital Age, consumer habits have changed permanently. Now, no matter where they are in the world, people have access to a wider array of information, products and services than ever before – making market competition fierce as a result.

Consumers want their products to be more cost-effective, more environmentally friendly, of higher quality and higher performance. And for manufacturers, demand is high for their products to meet these expectations.

The wet blasting process combines compressed air, abrasive media and water in slurry form to create a mechanical action that gives an abrasive effect. This effect can be used in a variety of different ways during the manufacturing of bandsaw blades to increase both lifespan and performance.

When considering the longevity and operation of a band saw blade, there are three distinct areas in which wet blasting can contribute.

Edge reduction

For manufacturers looking to extend the lifespan of their bandsaw blades, edge preparation is key. Edge honing is the process of rounding or increasing the radius of a tool's cutting edge.

By preparing an edge by increasing its radius, you can reduce the risk of chipping. This contribute er bandsaw blade life [1], and increases its performance by up to 200% [2], as well as eliminating the need to 'run it in'.

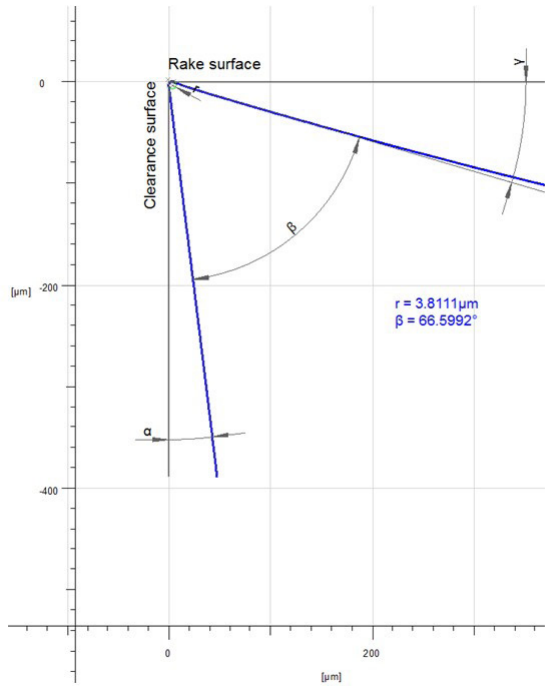
Edge honing bandsaw teeth by wet blasting at the microscopic level.

Without edge preparation, manufacturing operations lose efficiency, with increased downtime and higher rates of waste as saw blades need to be replaced more frequently. With sharper 'unprepared' saw teeth, manufacturers may see quicker cuts, but without any edge preparation the stress concentration at the edge can cause chipping [3].

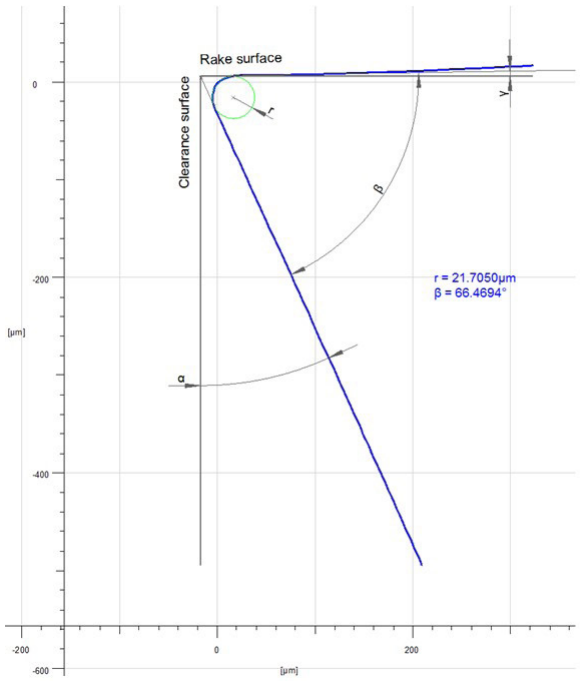
Similarly, a sharper cutting edge makes for poor heat dissipation, and, with temperatures reaching upwards of 1000°C, can be another cause of tool failure. In contrast, honed bandsaw blades allow heat to spread evenly, reducing stresses [4].

Given the range of saw substrates, cutting applications and the geometry of saw blades, there's no 'one size fits all' approach to edge preparation. Therefore, the more control you have throughout this process, the better for improved saw blade lifespan.

The ability to offer controlled edge radiusing to within +/-5micron (up to 100 microns) tolerance of specification, coupled with HF1surfaces makes wet blasting the preferred solution for many manufacturers.



Before wet blasting



After wet blasting

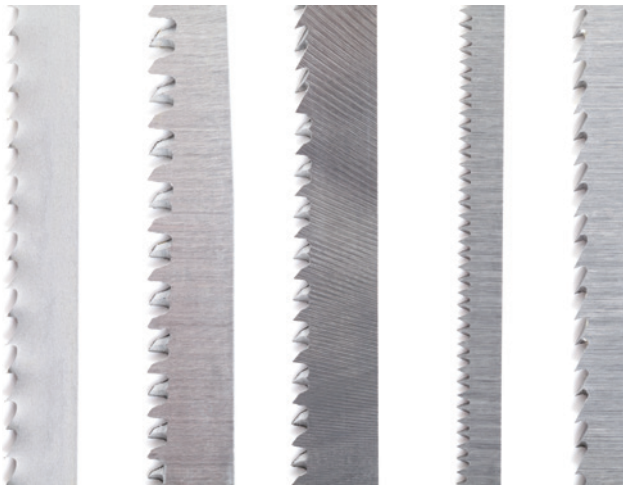
Wetblasting has been used for edge preparation for a long time, and has proven to be the most effective method [5]. This is in contrast with traditional methods such as running a saw in, which often gives mixed results, as it isn't very controllable and relies on the customer's experience to get a satisfactory edge hone. Wet blasting ensures every saw blade is optimised and ready to run at full speed straight away from new, putting the lifetime quality back into the control of the manufacturer.

Vapormatt's advanced wet micro-blasting systems use powerful software programs to control and monitor precise flows of liquid, gas and solids. These are mixed and accelerated through highly focused blasting nozzles. These systems give you full control over the air and slurry pressures, blast media, slurry concentration, the number and angle of blasting and the distance of your blasting nozzles, so you can achieve numerous processing effects for a range of cutting forms, including waterfall and trumpet hones.

Additionally, media concentration, process temperature, additives and blast pressures can be carefully controlled to give you an extremely consistent surface finish that can be reproduced time after time.

Vapormatt's leading wet blasting systems currently control up to 15 variables for optimised reliability and repeatability of the process.

The extent of this controllability is pushing edge preparation boundaries, as it becomes easier to achieve, and therefore experiment with new and different edge hones and forms.



Surface finishing

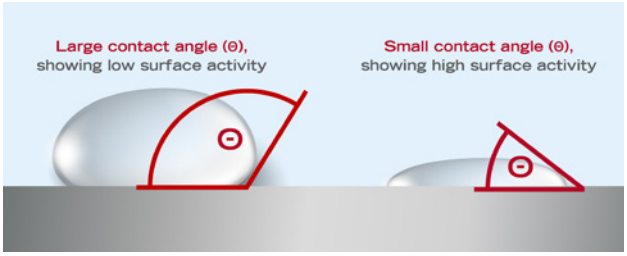
Giving your bandsaw blades a premium aesthetic finish is key to attracting consumers to your product and proving its high-end quality. Wet blasting is unrivalled in offering a consistent cosmetic finish.

The lubricating effect of the water creates an even flow of slurry, ensuring a uniform surface. This is unlike other micro-blasting processes, where a heavier impact and lack of flow create unpredictable results and increase the chances of chipping and uncontrollable wear. These other micro-blasting processes also have a significantly higher surface roughness.

The surface finish provided by wet blasting goes beyond the cosmetic. Its liquid cushion also protects delicate surfaces and prevents media particles from being left in the substrate for surfaces that are clean to a HF1 level.

Another benefit is the process' creation of an ' active surface' – one that has a particularly high surface energy.

This can be defined with a 'contact angle' as shown in the picture below.



The contact angle is directly related to the difference between the surface activity of the solid, and the surface tension of the liquid [10]. A high surface activity gives a high contact angle, helping liquids to spread out easily across the surface.

When looking at bandsaw blades, this has the effect of giving a good 'wet-out' surface, and any lubricant used will spread more easily, sticking to the saw blade more effectively.

This high surface activity also helps when applying coatings to the saw (CVD/PVD coatings, electroplating, painting etc.), by providing a surface which ensures these coatings stick well.

Conclusion

If you're a quality manufacturer looking to increase your operational efficiency, reduce waste, and produce bandsaw blades which are comparatively stronger, longer lasting and have a higher-quality appearance, wet blasting is the only solution.

With wet blasting, you can benefit from accurate and repeatable edge honing, peening and surface preparation in a single clean process. Your blades won't need to be 'run-in', and their premium finish means you can add value to your product, whilst enhancing your brand's reputation for quality.

At Vapormatt, we not only manufacture equipment suitable for cutting edge preparation and saw blade surface processing, but we also offer a custom engineering service called Wet Blast Support, helping businesses incorporate wet blasting process technology into their existing production lines. In fact, we're able to process coiled in-line, loop welded, single-sided or double-sided bandsaw blades.

Our wet blasting machines offer exceptionally high-quality results that are recognised globally by a number of the most prestigious tool manufacturers. And with the ability to offer controlled and repeatable results, our machines not only improve your saw blade quality and life: they're kinder to the environment, too, using less consumables and no harmful chemicals.

It's now time for the industry to work harder and smarter as we extend tooling life expectancy and provide complete satisfaction for every customer.

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Vapormatt, Robins Drive, Bridgwater, TA6 4DL, UK
t +44 (0) 1823 257976 e sales@vapormatt.com