



CENTRIFUGAL FANS  
**WEAR-INTENSIVE  
APPLICATIONS**

I am delighted that you are interested in using POLLRICH centrifugal fans in your industry.

Wear on centrifugal fans often means unplanned downtime and considerable costs for you.

As your partner, POLLRICH relies on decades of expertise and innovative solutions in wear protection. We precisely analyze the specific stresses on your systems in order to develop customized protective measures.

Our goal is to significantly extend the service life of your fans and thus increase your productivity in the long term.

**Frank-Martin Bub**  
Managing Director

# LIVING PRODUCTIVITY

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# Wear Protection

A strategic investment in operational safety and efficiency

## Decades of experience in wear protection

In demanding industrial environments, particularly in industries such as cement and steel production, large fans are exposed to extreme loads. Abrasive media transported in the air flow – including fine dust, quartz particles, corundum, or organic chips – cause significant wear on all components of the fan, from the impeller blades to the housing. This damage not only reduces material thickness and thus service life, but also leads to performance losses, imbalances, and significant follow-up costs due to unplanned downtime. At POLLRICH, we are aware of these challenges and offer customized protection solutions that represent an investment in the long-term profitability of your business.

POLLRICH has a long tradition in the development and manufacture of high-performance industrial centrifugal fans. As a recognized technology leader in the field of wear protection, we are continuously advancing research and development. Our engineers work closely with renowned research institutions and industry partners to develop innovative and effective protection strategies that withstand the toughest conditions. This in-depth expertise flows directly into each of our solutions.



*Typical wear patterns on centrifugal fans*

# Project Planning

Precision through virtual simulations

At POLLRICH, we work closely with our customers to analyze the properties of the media to be conveyed in detail, right from the concept phase of a new fan. If these contain abrasive or corrosive components, we proactively integrate comprehensive wear protection into the design.

Using state-of-the-art computational fluid dynamics (CFD) simulations, we can precisely map the complex flow conditions inside the fan. This enables us to simulate the load on the fan components caused by abrasive particles and identify wear patterns at an early stage. The advantages for POLLRICH and our customers are manifold.

- Optimized Design:**

We identify critical wear areas and optimize the design of the fan and the placement of wear protection even before production begins. This minimizes the risk of design errors and expensive rework.

- Predictive Maintenance:**

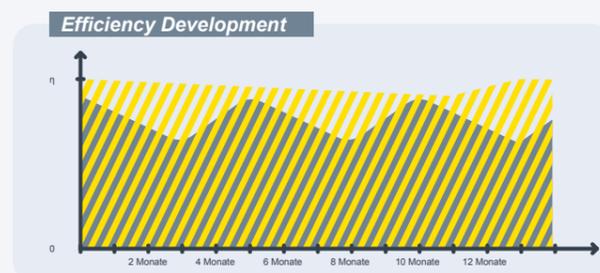
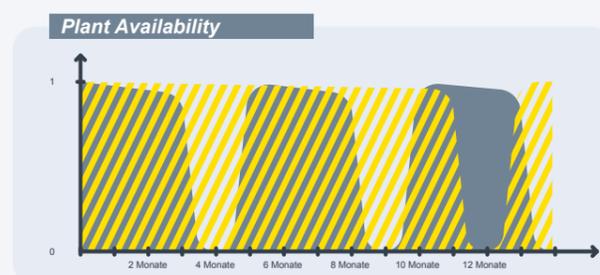
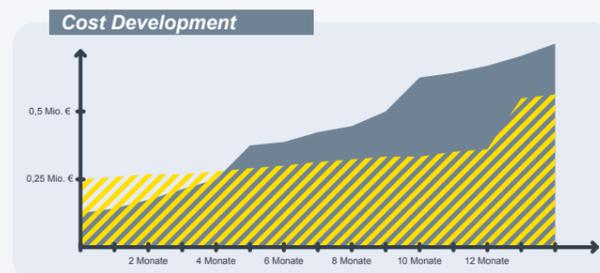
Our CFD simulations predict wear-critical areas under real operating conditions. Customers receive a more reliable assessment of maintenance intervals and can optimize their operational planning.

- Cost Reduction:**

The precise design of the wear protection prevents oversizing or undersizing, which optimizes material and manufacturing costs. The use of cost-intensive solutions is limited to the necessary areas, and operating costs are reduced in the long term thanks to reduced maintenance and longer service life.

- Maximum Energy Efficiency:**

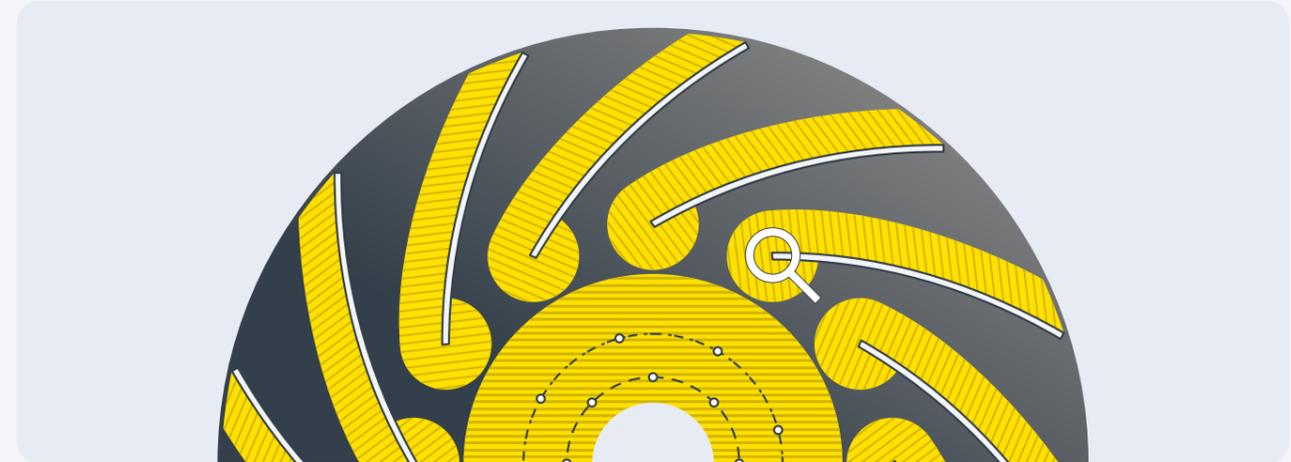
The simulations not only minimize wear, but also enable flow optimizations for improved energy efficiency of the fan.



■ Simple Wear Protection  
 ▨ POLLRICH Wear Protection

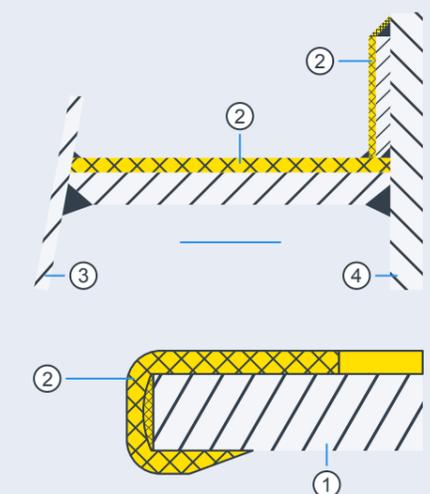
# Sustainable Solutions

Refurbishment and optimization of existing plants



Our advanced technology is not limited to new installations. POLLRICH also offers comprehensive services for optimizing and refurbishing existing fan systems. After dismantling and transport to our specialized workshops, the components undergo thorough cleaning, followed by visual inspection and non-destructive testing (e.g., ultrasonic and dye penetration testing). If required, we also perform flow dynamics simulations on refurbished fans to determine the optimal wear protection equipment and significantly extend the service life of your system.

Process	Dust Type	Ø grain size in µm
Iron / Steel	Dust from steel production	< 20
	Blast furnace slag	25 - 150
	Sintering dust	5 - 15
	Iron ore pellet dust	> 100 - 770
Cement	Raw flour	8 - 15
	Cement dust	10 - 20
Glass & Ceramics	Quartz sand	> 1
Wood	Dust from chipboard production	1 - 35



- ① Blade Base Material
- ② Hard Facing
- ③ Cover Plate
- ④ Wheel Base Plate

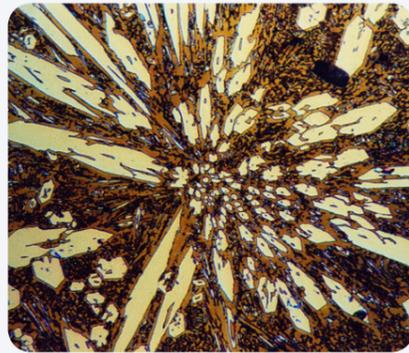
# Material Systems

Intelligent protection against aggressive particles

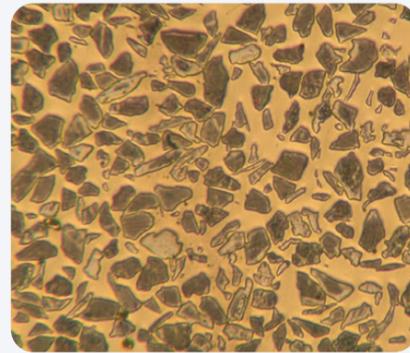
At POLLRICH, we know that simply increasing the hardness of a coating is not always the most effective solution. It is crucial to select a wear protection system that is precisely tailored to the specific properties of the abrasive medium – including its chemical composition, quantity, hardness, grain size distribution, and grain geometry.



Polished section Durmat WP1062



Polished section Durmat CP960



Polished section Durmat WP 1061

## Standard Verschleißschutzsysteme

Type	Hard material	Matrix	Max. Operating Temp.	Surface hardness RT	Special Features
P-WS-A	Cr-C	Fe	350°C	55-59 HRc	Standard Solution
P-WS-B	Cr-C, Mo	Fe	550°C	57-60 HRc	Increased operating temperature
P-WS-C	Cr-C, Nb	Fe	350°C	60-51 HRc	Increased wear resistance
P-WS-D	Cr-C, Mo, Nb	Fe	600°C	62-65 HRc	Increased operating temperature with high wear resistance
P-WS-E	WSC	Ni-B-Si	500°C	50 HRc	High wear resistance, conditionally corrosion resistant

For special requirements, such as very fine dust or a combination of wear and corrosion, application-specific and optimized wear protection solutions can be offered.

## Protection through optimized microstructure

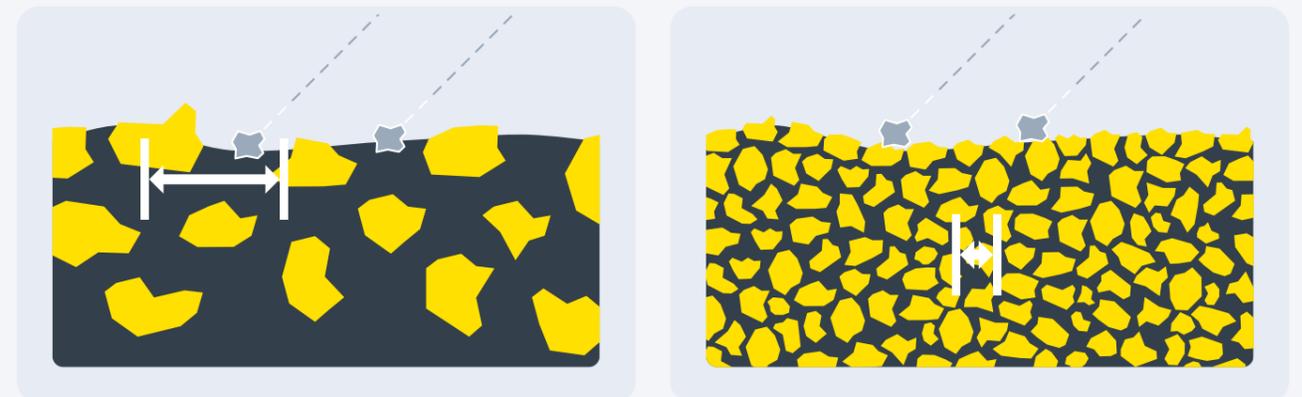
The effectiveness of a wear protection layer is largely determined by its microstructure, which typically consists of hard carbides embedded in a softer matrix. The interaction between these two components is crucial for resistance to abrasive attack.

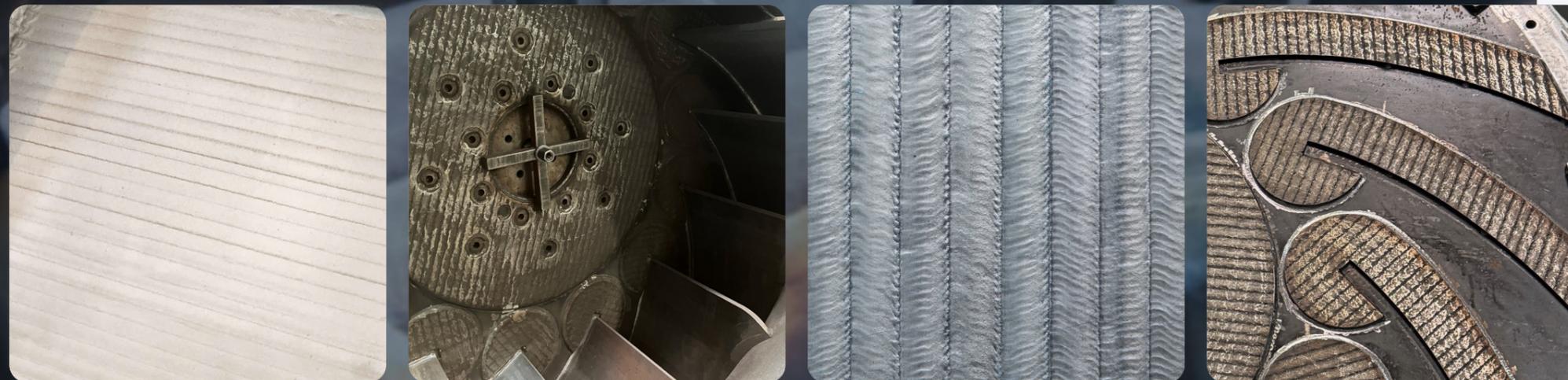
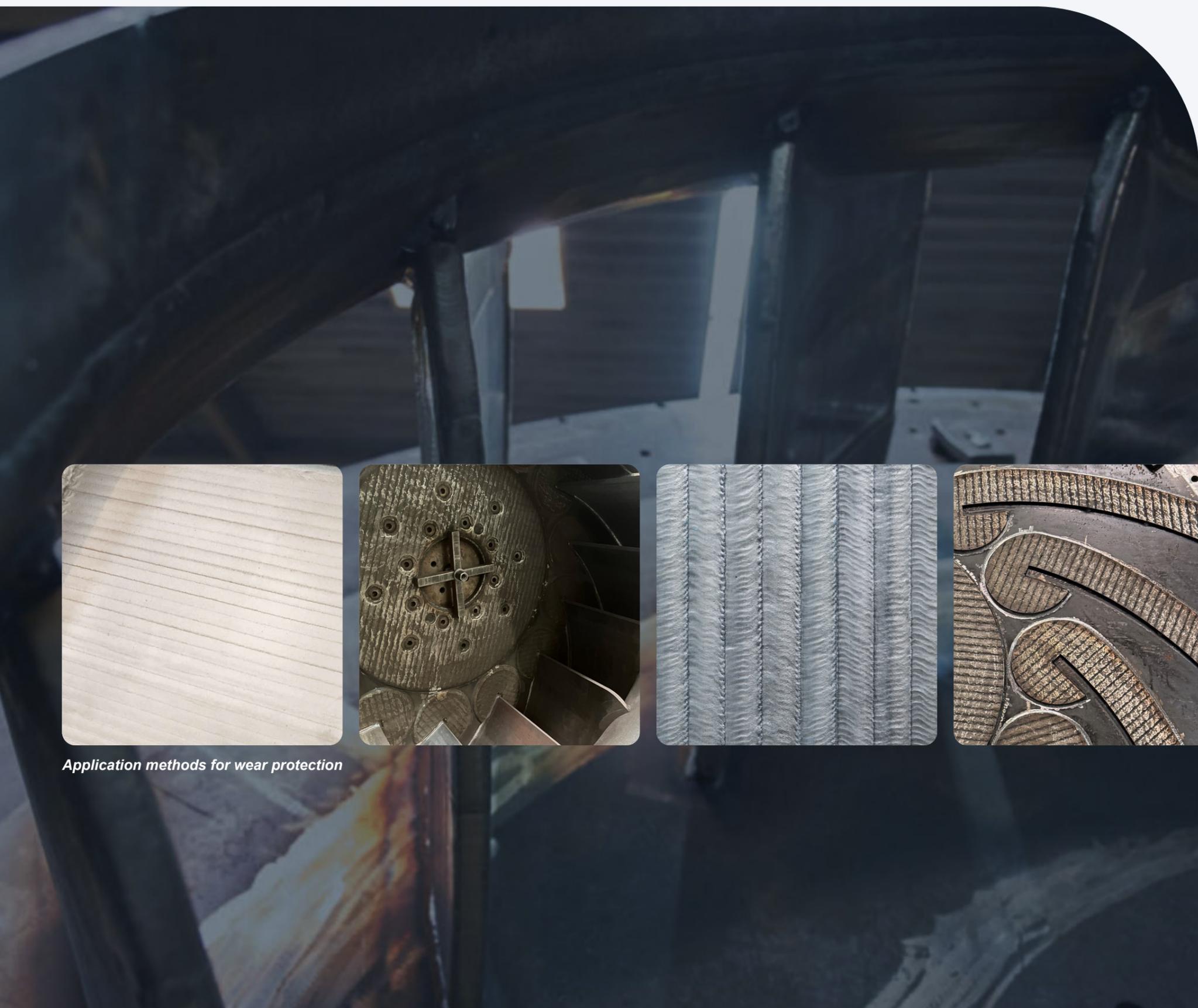
A critical parameter is the so-called line spacing – the average distance between the individual hard particles within the matrix. If this line spacing is too large in relation to the grain size of the abrasive particles, the aggressive dust particles can strike the softer matrix directly. This leads to comparatively rapid abrasion of the matrix, causing the hard carbides to lose their load-bearing function. The result is premature washing out of the carbides from the layer, which significantly reduces the protective effect and drastically shortens the service life of the wear protection layer. Under these conditions, the actual advantage of the hard and resistant carbides cannot be fully exploited.

Conversely, if the line spacing is smaller than the average diameter of the abrasive dust particles, these particles will mainly come into direct contact with the hard carbides when they strike the surface. This effectively protects the softer matrix from direct abrasion. In this case, the high resistance of the carbides is optimally utilized, as they bear the brunt of the abrasive stress. This leads to a significant increase in the service life of the wear protection layer.

The microstructure of the wear protection layer is largely determined by the processing during the manufacturing process. In addition to the good, consistent quality of the individual components, the manufacturing process is crucial for a consistent microstructure of the entire wear protection surfaces.

## Schematic representation of alloy with coarse and fine-grained hard materials





*Application methods for wear protection*

## **Application methods: Flexibility through welding or bolting**

In addition to the choice of material, the precise localization and application of wear protection measures is of crucial importance. Through comprehensive flow analyses and our many years of practical experience, our experts at POLLRICH identify exactly those areas of the impeller that are subject to increased wear. These typically include the blade entry edges, certain areas of the impeller blades, and the blade base. The center and side plates, the drive shaft, screw connections, the housing, and control valves and swirl regulators may also be affected. We define the optimum level of protection for each area. When repairing already worn impellers, the wear pattern allows us to directly identify the highly stressed zones for targeted and effective retrofitting.

At POLLRICH, the wear protection system is precisely tailored to your process parameters. Not every protection system is suitable for high temperatures, for example, and the application method chosen influences the overall costs. Combining different protection systems can optimize costs without compromising service life – for an optimal cost-benefit ratio.

### Optimal surface finish

We evaluate the surface finish of wear protection materials based on flow dynamics and particle sizes. For fine dusts, for example, we choose to align the weld beads against the flow direction or use a zigzag geometry to minimize the washing out of unavoidable cracks in the high-hardness protective layer. By combining the right material system with the appropriate manufacturing process, we can also achieve virtually crack-free surfaces.

### Welded solutions for blades

POLLRICH offers welded wear protection solutions for shovels. In the welded version, the protective layer is applied directly to the shovel or special wear plates are welded in. These can be maintained by repair welding if necessary.



### Early diagnosis saves costs

Even the best wear protection requires regular monitoring. POLLRICH recommends regularly checking the critical areas on the rotors of your centrifugal fans after prolonged operation. Reliable vibration monitoring, regular visual inspections of the impellers and monitoring of the bearing temperature are essential protective measures. If necessary, worn rotor areas can be reinforced in a targeted manner. Early detection of wear and the resulting preventive repair measures lead to significant cost savings.

POLLRICH offers a comprehensive preventive maintenance and repair service for fan impellers. We carry out this work either directly at your premises or in our own workshops – naturally for POLLRICH products as well as for other manufacturers' products. Trust in our expertise for maximum availability and efficiency of your systems.

### Our services at a glance

As part of our cooperation to optimize and implement wear protection and determine the efficiency of ventilation systems, we offer you the following comprehensive services.



Consulting & Analysis



Virtual flow simulation



Material selection & development



Design & Manufacturing



Application of wear protection



Assembly & Disassembly



Repair & refurbishment



Maintenance & Monitoring



Efficiency measurements on site

## LIVING PRODUCTIVITY

By Living Productivity, we also mean a management and corporate culture that is characterized by efficiency and productivity.

All internal and external services we provide have a direct impact on our customers' productivity. The service packages are individually tailored to offer customers maximum added value in terms of productivity gains. This added value makes us not only a sought-after partner for customers, but also a reliable companion for employees and suppliers.



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