Increasing the Life of Worn Parts by Welding and Coating in a Protective Gas Environment

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Abstract: This article analyzes the wear of machine part surfaces commonly used in industry and agriculture and methods for their restoration. Particular attention is given to the surfacing process in a protective gas environment (argon, helium, SO₂). Experimental results demonstrate that this method significantly increases the service life and wear resistance of restored parts.

Keywords: Wear, surfacing, protective gas environment, argon, coating quality, operation, mechanical properties.

Introduction: Currently, various mechanical equipment and machines used in industry, construction, transport and agriculture are subject to frequent wear during long-term operation under the influence of constant load, friction, temperature and corrosive environments. In particular, since working bodies such as lifting mechanisms, earthmoving equipment, moving bearing surfaces, shafts and wheels operate under intensive loads, geometric changes, micro-damages and abrasive wear are observed on their surfaces.

Such situations the details completely from work to the exit, the car or of the mechanism general reliability to decrease take is coming. If eaten or damaged the details complete to the new one replacement way if selected, this situation big material cost, production release cycle stop, and time to the loss reason will be. Therefore, there is the details again restore, that is their work resource increase through economic efficiency provide today's of the day current from problems one is considered.

This problem effective solution to grow from the methods one - welded cover technology. This method eaten or damaged detail to the surface suitable from the material prepared metal coating layer welding through application own inside In this process detail original geometric shape, constructive dimensions and mechanical-physical properties again Especially welding process defender gas in an environment (e.g., argon, helium, carbonate anhydride – SO₂ or their mixtures) increase detail to the surface covered metal of the layer quality noticeable at the level increase opportunity gives.

Protection gas in the environment take to go welding process hot of metal atmospheric oxygen with to react entering oxidation prevent takes. Also, such under the circumstances pores, noises, porosity such as internal defects appearance to be probability decreases, this and coating layer density, one sexuality and to work endurance increases. Correct chosen welding modes and materials based on covered surfaces, usually, basic higher than the material strength and to be eaten to endurance has to be possible.

Experience results this shows that quality welded cover through of details work duration up to 1.5-2 times, some in cases even more increases. This is technician service show range extension, exploitation expenses reduce, work release efficiency increase such as positive to the results take is coming.

This attitude with, this in research eaten surfaces protection gas in the environment welded cover technology, its to the parameters impact doer factors, used electrode materials and their details on the surface harvest did coating to the quality impact deep analysis Also, the laboratory and field in the conditions tests based on restored of details to be eaten endurance level is also studied.

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Figure 1 Protection in the environment welding electrical circuit.

Studies show that the welding and coating process performed in a protective gas environment has the following advantages: Achieving cleanliness and uniformity in the coating;

The microstructure of the coating layer is uniform and has low defects. The coating achieves surface cleanliness and structural uniformity. The coating has a uniform texture and forms a layer without defects. It is possible to coat the surface uniformly and cleanly. In the popular approach: The coating is smooth, uniform and without errors and defects on the surface. Increase the strength and wear resistance of the surface of the part;

As a result of the welding coating, a high-strength and wear-resistant layer is formed on the surface. The mechanical properties of the surface layer are improved, and its wear resistance increases. Technically: The coating makes the part more resistant to mechanical loads and reduces its wear rate. Due to the increased surface strength, the service life of the part is extended. In a simple and understandable way: As a result of the coating, the surface becomes harder and more wear-resistant. The restored part becomes stronger and more durable than before. "As a result of the coating, the strength and wear resistance of the surface of the part increase, which serves to extend its service life." Technological simplification of the restoration process; The technological indicators of the restoration process are improved, and the processing stages are simplified. The method used allows for automation and rapid implementation of the process. The implementation of the technological process is facilitated and time efficiency is increased. The equipment and operating modes are simple and can be widely implemented in production. In a simple and understandable way: Restoration is facilitated, no complex equipment or special conditions are required. With this method, the restoration of the part is carried out quickly and conveniently.

"The welding coating method technologically simplifies the restoration process, which ensures its widespread use in production." Another important advantage of welding coating technology is that it **technologically simplifies the restoration process.** Processing processes in this method are amenable to automation and are carried out quickly and accurately on special equipment. Coating of materials selection, welding regimes optimization and protection gas in the environment stable work process efficiency further increases.



Figure 2; Welded and coated detail

This allows for **technological ease, time savings, and overall resource efficiency in production.** Economic efficiency and resource efficiency.

Conclusion. The technology of welding and coating worn machine parts in a protective gas environment is an effective, economical and resource-saving method of their restoration. This process allows you to restore the geometric shape of the surface of the part, increase its mechanical strength

and create a wear-resistant layer. Due to the high purity and uniformity of the coating, its reliability and service life are significantly increased. Also, due to the technological simplicity of the welding process, its suitability for automation and low energy and material consumption, this method has high economic efficiency. The introduction of this technology serves to optimize the repair work at the enterprise and increase production efficiency.

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