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Laser technologies accompanying laser impact machining of parts: cleaning, polishing, surfacing (a review)

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A variety of laser technologies are actively used in metalworking. In particular, laser shock peening (LSP) is the most effective way to increase the service life of metal structures subjected to high-cycle loading. It is used to increase the resource of expensive structural elements, for example, aircraft engine parts. It is recommended to subject parts that have passed a certain period of operation to such processing. However, in addition to LSP, it makes sense to add some related laser technologies to the technological cycle, such as cleaning, polishing and cladding. These technologies have long been used in metal processing. Used parts, first of all, need to be thoroughly cleaned before the LSP process. Laser cleaning is most effective for this. Then the part may need repairing of the nicks, for which laser cladding is very effective. After carrying out these operations, as well as LSP, polishing of the part is usually required, which is also possible using laser technologies. This article discusses the main laser methods for cleaning, cladding and polishing metal structures.

Keywords: polishing, cleaning, cladding, laser, gas turbine engine blade, laser shock peening (LSP).

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