

Liquid Metal Embrittling of Materials (Rehbinder Effect) as Means of Effecting Military Equipment

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A decreasing of mechanical strength of metal sample in a presence of ultrafine layer of some liquid substance covering its surface is known as Rehbinder Effect. Full explosive destruction of the sample is often observed in this case. As a rule, an insignificant mechanical tension is necessary for initiation of the process. A nature of this effect remains unknown in spite of enormous number of experimental data. Any liquid covering is not capable to cause this effect and an algorithm does not exist so far to select a such covering.

Rehbinder Effect allows to destroy the elements of metal constructions and military equipment under realization of antiterrorist and peacemaking operations with minimal energy losses. The main task is creation of superfine layer on objects. Then the objects are destroyed immediately. The effect is strictly selective: some materials are destroyed, the other ones are not destroyed. In a number of cases, the used substance is completely safe for the person.

A basis of our approach to the problem is conception about an electromagnetic nature of Rehbinder Effect. It is supposed that a reason for destruction of a sample is connected with the process of localization of an external electromagnetic field in fractal system of cracks on its surface. The filling of these cracks by specially selected liquid components intensifies this process. A consequence of localization in fractal system of heterogeneities is creation of very strong local coherent electromagnetic field inside the system. Their intensity is quite enough for generation of new cracks in a sample. New electromagnetic fields are localized in new cracks etc. Finally, this self-sustaining process results in to the mechanical destruction of the sample.

- A theoretical model of the process of localization of an electromagnetic field, localization of acoustic and deformation fields in fractal system of cracks on a metal surface, in system of dislocations of solid state, in fractal system of heterogeneities of modern composite materials is created.
- A possibility to influence on the process of material destruction by means of external electromagnetic and acoustic fields is investigated.

Key result:

Creation of an algorithm for selection of pairs (solid + liquid covering) capable for self-destruction.

Key words: liquid metal, embrittling effect, material destroy