

1.3.66. LONG-RANGE FIELDS OF INTERNAL STRESS AND ESTIMATION BY SPECTRAL-ACOUSTIC METHOD

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The purpose of the present work is the revealing influence of local internal long-range fields in long-term working metal of dangerous technical objects onto the acoustic characteristics. The research of long-term working metal of thermal power station steam lines (steel 12H1MF) and blast-furnace stove jackets (steel 09G2S) on different stages of life cycle was conducted with electronic microscopy and roentgenstructure analysis methods. Acoustic characteristics were measured with "Astron" – multipurpose acoustic system. Fields of internal stress sources were determined with electron-micro-examinations, and their quantity and character of change were estimated while the equipment was in long-term use. Structure-phase research of metal condition and estimation of internal stress were conducted in acoustic measurements section, where the time of surface acoustic waves delay was fixed.

As result of conducted research it was established that attenuation of ultrasound vibrations took place on internal long-range stress fields sources, and maximal delay time of surface acoustic waves was fixed in zone of internal stress fields concentration. Besides, base of conducted research was the density of extintional contours (bending-torsion) and internal stress with long-term strength of chromium-molybdenum-vanadium steel were determined. It was shown that the reduction of long-term strength was occured and probability of failure was increased at increase of extintional contours and internal stress density.

Based on numerous researching results the acoustic complex criterion of technical equipment limiting state of dangerous industrial objects was developed.