

1.7.3. THE PRIME PROBLEMS OF ACOUSTIC-EMISSION DIAGNOSTICS AND MONITORING OF TECHNICAL DEVICES AND CONSTRUCTIONS

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The acoustic emission (AE) method which in the industry is applied already more than 30 years, has appeared rather useful as a method of Non-Destructive Testing (NDT). The main advantage of method is ability to estimate a degree of danger of defect for object. The huge potential of AE method should be realized in the field of monitoring. However now method AE develops in a greater degree in breadth, instead of deep into.

That AE method became a method of technical diagnostics (TD) and monitoring to the full, it is necessary, that under indication AE critical decisions concerning destiny of object were accepted. For this purpose it is necessary to consider in details all elements and problems of method AE, to estimate a degree of the decision of these problems and to plan directions to which it is necessary to concentrate efforts on the further developments. We shall remind, that in term TD (definition of a technical condition of object with the purpose of an estimation of safety and forecasting of a resource) the main tasks demanding the decision already contain.

The basic problems in the field of AE a method are presented in fig. 1.

In the table the expert estimation is presented to "the importance of a problem" and "the degree of the decision of a problem". The importance is connected with reception of an estimation of danger of AE source for a design.

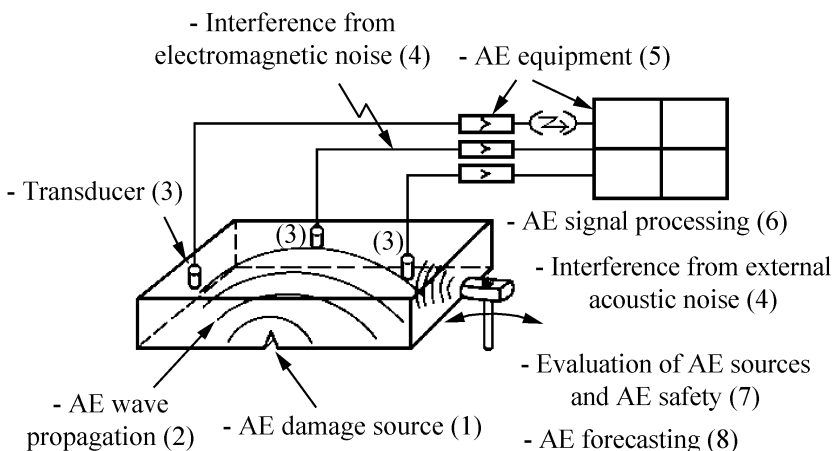


Fig. 1. Problems of AE method:

- 1 – AE source models; 2 – Propagation of AE signals; 3 – AE transducers;
- 4 – Noise and interference; 5 – AE instrumentation; 6 – AE signal procession;
- 7 – Assessment of AE sources; 8 – AE forecasting

Table

№	The Main Problems	The importance of a problem, (0.0–1.0)	The degree of the decision, %
1	Source AE (acoustic mechanism)	0.2 – 0.4	50 – 70
2	AE channel	0.4 – 0.6	60 – 80
3	AE transducer	0.5 – 0.7	70 – 80
4	Interference and noise problem	0.8 – 1.0	50 – 70
5	AE Equipment	0.3 – 0.5	90 – 97
6	Processing AE signals	0.8 – 1.0	10 – 30
7	AE procedure	0.8 – 1.0	80 – 95
8	Assessment of AE sources	0.9 – 1.0	10 – 20
9	AE prediction	0.9 – 1.0	00 – 10

Problems of AE method can be subdivided into 4 levels (on a degree of significance for AE method).

1. Fundamental (problems 1, 8, 9 in Table).
2. Basic (problems 4, 6).
3. Actual (problems 2, 3).
4. Current, technical (problems 5, 7).

Depending on potential and the purpose of the researcher the choice of a subject of researches from the specified problems can be made.