1.14.13. RISK CONTROL AND ADJUSTMENT FOR OPERATED BUILDINGS AND CONSTRUCTIONS

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In order to ensure accident-free operation of buildings and constructions, it is necessary to know the safe remaining life of an object, i.e. remained time of its safe operation.

Following scientific provisions are taken as a basis of methodology for determination of the safe remaining life:

1. There are no absolutely safe buildings and constructions existed.

2. Ratio of actual and theoretic probabilities can serve as an index of the structural safety of construction project (building accident risk).

3. There are threshold (invariant) values of accident risk; when these values are achieved, construction project transfers into qualitatively another technical state irrespective of its structural type and number of storeys.

Information for calculation of the project accident risk must be presented in formalized form allowing virtual statistical testing of the project accident risk to be performed on the basis of computer simulation of emergency situations. Technology of diagnostics of the technical state of a building (construction) built on the principles of qualimetry theory meets such requirements. Probability law of degradation of the groups of single-type structures of the project load-bearing frame is taken as a basis of this technology.

Knowledge of the technical state of operated construction project is not enough for obtaining of complete picture. It is necessary to possess with information on the duration of its safe remaining life.

Forecast of building (construction) life is based on assumption that wear $J(T)$ is a continuous function of time T and has derivative $dJ(T)/dT = -iJ(T)$, where: i – is intensity of structural wear in the process of project operation. Following integration of this differential equation and determination of integration constant from condition $J(0) = 0$, one obtains that intensity of structural wear is a mean-value function of the project accident risk at the moment of operation time T.

Knowing mean value of the project accident risk at the given moment of operation time, it is possible to find intensity of structural wear. With known value of wear intensity, it is possible to determine the safe remaining life of a building.