It is well known that brittleness is not a constant property typical of the material but it is a state into which the material may transfer with the variation of temperature, loading rate, the type of stress state, the magnitude of applied load, effects on the structure of the body, etc. In many materials, temperature has the strongest effect on the ductile-brittle transition. In addition to this, for the working structure temperature is often the only variable external parameter since the force fields are given from the start of service. This situation resulted in the selection of the generally accepted criterion for evaluating the susceptibility of materials to brittle fracture, i.e., critical brittleness temperature $T_{cr}$ [1].

Value $T_{cr}$ is determined by means of experiments from the temperature dependence of some parameter (impact toughness, stresses or strains at the instant of failure, work of crack propagation, etc.) in the given loading conditions. In many cases, these parameters change smoothly with temperature, and the selection of point $T_{cr}$ is highly conventional (on the basis of the 50% ductile component on the fracture surface of the impact-fractured specimen, from half the impact toughness value at room temperature, etc.).

It may be assumed that $T_{cr}$ has lost its initial meaning of the temperature of the ductile-brittle transition and is regarded rather as a comparative characteristic used for selecting, from the materials of the same type, the material with the highest brittle fracture resistance. However, the existence of the differences in the temperatures $T_{cr}$ determined by various methods (the difference may reach 100°C [2]) complicates the application of this characteristic in practice. It is evident that the unsatisfactory estimate of the brittle fracture susceptibility of the material obtained in certain cases on the basis of $T_{cr}$ is associated with the differences of the set of the loading conditions in determining $T_{cr}$ from those existing in the real structures.

One of the methods of more objective evaluation of the brittle fracture susceptibility of the material is the determination of the dependence of the parameter characterizing this susceptibility not as much on the loading conditions as on the properties of the structure itself. The ductile material reaches the yield stress without fracturing since there are suitable conditions (including temperature, loading rate, the type of stress state, structure) for scattering the elastic energy of the body in microplastic shearing whilst in the brittle material part of the energy in the vicinity of the stress raisers is used for the formation and propagation of cracks. Thus, the brittle fracture susceptibility of the material may be examined on the basis of the capacity for microplastic behavior. The capacity of the material for microplastic behavior does not specify the absolute value of strain prior to failure, which, naturally, depends on the loading conditions, but it indicates the existence of a set of deformation mechanisms with which microplasticity may be realized (with various degrees of localization).

The initial structure determines the operation of specific type of deformation mechanism, i.e., strain capacity is determined only by the structure of the material. The development of deformation depends both on the loading conditions and structure. The importance of taking into account the structure and type of plasticity (slip, twinning) was mentioned in [3, 4]. Methods of calculating the stress of brittle fracture and ductile-transition temperature were also presented in these studies.
In this work, we developed a new experimental method of determining the brittle fracture susceptibility characteristics of the material, i.e., critical brittleness temperature [1]. The method is based on the assumption according to which brittle fracture in the material develops if there is no scattering of the elastic energy of high local strains as a result of plastic deformation or if the rate of this scattering is very low. The measure of intensity of energy scattering in this method is the rate of microplastic deformation of the specimen at stresses below the macroscopic yield limit of the material.

It is well known that local plastic deformation of microheterogeneities of the structure, i.e., nonmetallic inclusions, second-phase precipitates, grain boundaries, etc., may occur in the material even if it is loaded in the plastic region. Occurrence of microplastic deformation may be associated with the existence of interphase boundaries between structural members. The difference in the strain of the adjacent elements of the structure