Materials of Conferences

FRACTURE SURFACES UNDER PLASTIC DEFORMATION

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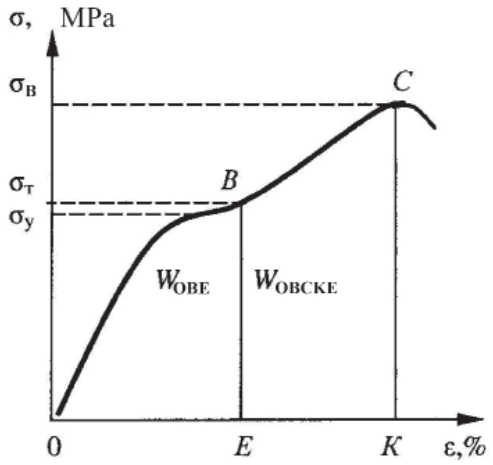
Increasing the strain energy effects on the surface of the component leads to a transition from elastic to plastic deformation. Formation of the minimum residual deformation begins when the surface layer of the metal yield strength (σ_T) and requires the application to the unit volume of the energy exposure, corresponding OBE area under the curve (Figure).



Changing the energy of plastic deformation in tension

Limit the degree of uniform plastic deformation occurs at voltages equal to the tensile strength (σ_B) materials. Creating this level of stress state requires strain energy cost equal to the area under the curve OBCKE.

Increasing the degree of loading of a metal volume of the surface layer above the yield stress at the time of the contact leads to the formation of plastic deformation-malized zones. Repeated loading of these areas are subjected to re redeformation that amplifies motion of dislocations in the process, not only the surface layer but also in the metal. With the increasing number of cycles of concentration in the deformed metal is increased and at the same time hindered the output of crystalline structure defects on the surface of the product. The lower the coefficient of hardening during plastic deformation, the metal is more ductile, especially stage can be prolonged exposure to the external force beyond the yield stress. Achieving the ultimate degree of hardening on the material with the higher coefficient of hardening occurs at lower values of the plastic deformation. Strain hardening during deformation fades. This is because the maximum possible dislocation density does not rise above. At this limiting level, the emergence of new dislocation balanced by the number of endangered dislocations as a result of their output to the surface and annihilation. Resulting in the process of plastic deformation in some parts of the accumulation of dislocations, which is close to the limit level, accompanied by the formation of the embryonic fissure.

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