

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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SIMULATION METHOD FOR UNILATERALISM COUPLING OF DIFFUSIVE AND DEFORMATION

Abstract

Nonmetal material such as rubber are commonly used for sealing, coating as well as isolation. With the help of experience, criterion and acceleratory test, reliability of nonmetal material-based systems is usually remarkable. Delicacy and knottiness comes true when demand for life-span is inescapable. Actually, aging with and without environment factor could bring change of nonmetal material. Then, foregoing change weaken effect of sealing, coating as well as isolation. For sealing frame for illustration, strategy for aging evaluation could be concluded as three key words, testing, accelerating, and extrapolating. Firstly, exploration on chemical bond is usually employed to expound the aging of material under thermal, oxygen or water ingredient. Secondly, accelerating test on specimens is used to obtain degenerate orderliness without neonatal mechanism. Finally, degenerate orderliness is popularized to sealing frame with slender diversification. At the present time, this popularizing has representational standard means, such as GB/T7041-86, GOST 9.713-86. Distinct deficiency is that well-proportioned aging is inauthentic for physical objects. Focusing on the simulation of coupled process of diffusive, response and deformation, this paper put forward a technique that calculate the performance of the nonmetal material-based systems. Strategy for simulation based on ABAQUS/CAE is put up as following: (1) disposal on thermal parameter is prerequisite under the sole restriction as $k/(c\rho)=\lambda=D$, (2) FEA of diffusing based on ABAQUS/CAE and equivalent temperature listed as $m=T(t,x,y,z)$, (3) Considering the sincerity of variable t , relativity between property and equivalent temperature described as $Ch=Ch(t)=Ch(t(m))$, (4) FEA on nonmetal material-based systems in its service life. Illustration on Pipeline covered by coating for the usage of gas transportation indicates that, 1) This technique actualizes the intercourse between surroundings and structural object, 2) it is based on ABAQUS/CAE without any coding or multifarious theoretic, and 3) considering on the diffusion of media, this paper put out an accurate channel to evaluate the life-span for industry structure.