I-1 Self-waterproofing of modern concrete structure and its application

Jiaping Liu

State Key Laboratory of High Performance in Civil Engineering Materials, Jiangsu Research Institute of Building Science Co., Ltd, Nanjing, Jiangsu, China. ljp@cnjsjk.cn

ABSTRACT

Self-waterproof concrete structure, also called rigid waterproof concrete structure, is a kind of reinforced concrete structure which has a certain ability of waterproof due to the compactness of concrete itself. It has both load-bearing and retaining functions and can satisfy the requirements of a certain resistance to freeze-thaw and corrosion. Modern concrete has the characteristics of large fluidity, widely-using mineral admixtures, high content of sand and cementitious material, so its compactness is better, while the cracking problems is prominent, as a result, cracking has become the key problem of leakage of reinforced concrete in engineering. Under this background, a multi-field (hydro-thermo-chemo -mechanical) coupling model has been adopted, a crack-risk assessment method has been proposed, and the dual-regulation technology of temperature field and expansion history has been produced, which not only reduces the peak temperature of concrete, but also compensating the whole-process shrinkage by stages, as a result, the crack risk can be controlled less than 0.7. The engineering application results show that, through the scientific design of concrete deformation and crack resistance performance, and the appropriate use of anti-crack technologies, concrete cracking can be completely avoided, and the leakage problem of structure can be solved.