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Sommario/riassunto	This thesis studied the effect of aging of intumescent coatings (ICs) on the reliability of protected steel columns in fire condition and developed a probabilistic approach to assess the service life of ICs applied on steel columns. In the study, Monte Carlo simulations were conducted to obtain the reliability index or failure probability of steel columns protected by ICs subjected to compartment fires. The effect of aging of intumescent coatings on the failure probability of protected steel columns was investigated by using variable insulation property of intumescent coatings in the simulation. The test data on aging effect on insulation property of intumescent coatings from literature was

used. Based on the reliability analysis, a probabilistic approach is given to determine the service life of intumescent coatings for steel columns. In that approach, the failure probability of the protected steel columns is compared with the target probability of the structural fire design. The approach can also be used for probabilistic analysis of steel columns protected by conventional inert fire protection materials.