上海交通大学＂海外名师计划＂访问教授 Yoichi Sumi 船舶结构力学讲座

题目：Strength and deformability of corroded steel plates - experiments and numerical simulation (受腐蚀钢板的强度和变形：试验与数值仿真研究)

时间：2017 年 5 月 10 日，上午 10:00

地点：上海交通大学闵行校区木兰船建楼 B808 会议室

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摘要：
The objective of this study is to estimate the strength and deformability of corroded steel plates under quasi-static loading. In order to accurately simulate this problem, we first estimated the true stress–strain relationship of a flat steel plate by introducing a vision sensor system to the deformation measurements in tensile tests. The measured true stress–stain relationship was then applied to a series of nonlinear implicit three-dimensional finite element analyses using commercial code LS-DYNA. The strength and deformability of steel plates with various pit sizes, degrees of pitting intensity, and general corrosion were estimated both experimentally and numerically. The failure strain in relation to the finite element mesh size used in the analyses was clarified. The strength and deformability did not show a clear dependence on the yield ratios of the present two materials, whereas a clear dependence was shown with respect to the surface configuration such as the minimum cross-sectional area of the specimens, the maximum depth of the pit cusp from the mean corrosion diminution level, and pitting patterns. Empirical formulae for the reduction of deformability and the reduction of energy absorption of pitted plates were proposed which may be useful in strength assessment when examining the structural integrity of aged corroded structures.