

ASSESSING THE EFFECT OF IN-SERVICE INSPECTIONS ON THE
RELIABILITY OF DEGRADING COMPONENTS

by

Christian Garrigoux and William Q. Meeker
Iowa State University

Abstract

In this paper we combine a reliability model and an inspection model to provide a means of planning in-service inspections. Inspections are planned so as to keep the hazard function for the component below a specified threshold. Although our degradation model is more general, the example involves fatigue failure with a random effects model to describe unit-to-unit differences in degradation and reliability. The random effects in this example are initial crack size and two Paris law crack-growth parameters. Although the inspection model is again more general, our example uses, as is common in the airline industry, given periodic inspection opportunities and a probability of detection (POD) function. The POD is often given as a simple function of crack size.