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Engaged in safety research on nuclear-powered ships at the National Maritime Research Institute, Ministry of Transport. Studied at MIT, U.S.A. from 1979-1980, became Director of the National Maritime Research Institute in April 2001, Professor at the Graduate School of Engineering, Utsunomiya University in April 2006, and has been in his current position since April 2013. Engaged in research on system reliability engineering and safety engineering. He has conducted seismic fire risk assessment of nuclear power plants, developed GO-FLOW method, and developed reliability analysis method for loop structured systems, and applied them to various engineering systems. Member of the Reliability Engineering Association of Japan, the Atomic Energy Society of Japan, the Engineering Academy of Japan, and others.

III-5 Availability Analysis of Heliotron J water-cooling system by the GO-FLOW methodology

Abstract

Heliotron J is a fusion research device, specifically a helical-axis heliotron designed to study plasma confinement It is located at the Institute of Advanced Energy, Kyoto University. Experiments with the Heliotron J are conducted continuously for six months and the remaining time is spent on system maintenance. The availability of the water-cooling systems of the Heliotron J is critical for the successful operation of the system. Reliability/availability analysis of the cooling systems have been performed by the GO-FLOW methodology for possible maintenance schedules and methods.The equipment is divided into several groups. Important active components such as pumps, valves, motors are checked and repaired annually. Less important passive components, such as filters, piping are checked once every two years or three years. The study examines the effects of different maintenance practices. Component failure rates were assigned based on the Heliotron J operating records. Also, the data shown in nuclear industry are referred.

The water-cooling system was modeled into GO-FLOW chart giving failure data and analysis conditions. Analyses are performed for the possible combinations of different maintenance schedules and maintenance effects. Results of the analysis will be used to determine strategies for maintenance schedules and methods.