

Development of On-line Structural Condition Monitoring System in Korean Nuclear Power Plant

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Summary

The on-line structural integrity monitoring systems and the related techniques have been developed in Korean nuclear power plant for the purpose of Condition Based Maintenance(CBM). There are four different kinds of systems such as IVMS(Internal Vibration Monitoring System), LPMS(Loose Part Monitoring System), ALMS(Acoustic Leak Monitoring System), and RCP-VMS(Reactor Coolant Pump Vibration Monitoring system). The purpose of the IVMS is to monitor and diagnose the axial preload of the core support barrel and the abnormality of the motion of the fuel bundles inside the reactor pressure vessel. The LPMS is being operated to detect and alarm the presence of loose parts within the primary or secondary side of the pressure boundary of the reactor coolant system. Also, it provides the diagnostic information in estimating the location and mass of the impacted loose part. The ALMS is to detect the presence of leaks at specific locations and/or components of the primary system, and alert it to operator. Additionally, it is to identify the opening status of the pressurizer safety valves in the system. Finally, the RCP-VMS is to monitor vibration levels and provide information to detect the abnormal conditions of the RCP(Reactor Coolant Pump) frames and shaft such as a shaft misalignment, a rotor unbalance, oil whirl, and a shaft crack, etc. In future, the integrated and intelligent condition monitoring technologies are being developed based on smart sensor network and knowledge-based modeling for the optimal CBM of the primary and secondary pressure boundary components.

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