عنوان مقاله:

Selecting an Appropriate Scenario for Implementing RCM and RCA to Reduce System Average Interruption Duration Index with Systems Dynamics Approach in Power Distribution Companies

محل انتشار:

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خلاصه مقاله:

The mission of power companies is to provide standard and reliable electricity to their customers, and one of the threats of not fulfilling this mission is breakdowns and accidents in the electricity network equipment. The System Average Interruption Duration Index (SAIDI) is a critical indicator in the power distribution industry to determine network reliability; Reliability Centered Maintenance (RCM) and root cause analysis (RCA) of failures and applying the results of these two in two dimensions of network maintenance and design, are two effective measures in reducing SAIDI. This paper presents a model for the system and structure that creates SAIDI behavior, which can be simulated to achieve appropriate policies to determine the level of use of RCM and RCA and, thus, the optimal value to reduce the index value. The System simulation method has been used to simulate system behavior. After designing and simulating the cyclic causal model, various scenarios for determining RCM and RCA policies are proposed and reviewed, and the results are presented. The criterion for selecting the appropriate scenario in this article is to reduce the SAIDI index's value further. Based on the research findings, the policies selected have a suitable reducing effect on SAIDI. The model's validity was evaluated through behavior replication testing, extreme condition assessment, and sensitivity analysis. Since the organization's vision in ۲۰۲۶ is to reduce SAIDI to ۱۴ minutes per year, the impact of RCM and RCA policies in different scenarios on the model variables was evaluated. The results showed that if the existing policies are not changed, the process of SAIDI changes will increase. Changing the system approach from non-implementation to implementing RCM and RCA under optimal conditions will decrease SAIDI from ۲۶.۷۳ minutes at the beginning of ۲۰۲۰ to ۴۱.۳۴ minutes by the end of ۲۰۲۶

کلمات کلیدی:

System dynamics, System Average Interruption Duration Index, Reliability Centered Maintenance, Root Cause Analysis, Power distribution companies