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# IMPACT OF POWER DISTRIBUTION FEEDER'S CONTRIBUTIONS TO SYSTEM RELIABILITY INDICES

***Ganiyu Adedayo Ajenikoko[1], Lambe Mutalub Adesina[2], Olusoji Simeon Olaniyan[3] & Yaqub Adunfe Kosiru[4]***

*[1,3,4]Research Scholar, Department of Electronic and Electrical Engineering, Ladoke Akintola University of Technology, Ogbomoso, Nigeria*

*[2]Research Scholar, Department of Electrical and Computer Engineering, Kwara State University, Malete, Ilorin, Nigeria*

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## *ABSTRACT*

*System reliability is the ability of the power system to provide an adequate supply of electrical power at a desired time without interruption. Reliability indices are the parameters used for a comprehensive assessment of electrical power systems reliability. This study employed System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI) and Customer Average Interruption Duration Index (CAIDI) as reliability indices to analyze the impact of power distribution feeder's contribution to system reliability indices. Ten distribution feeders were selected from Kaduna and Kano distribution feeders and computed using appropriate mathematical relations. In addition, a comprehensive comparative analysis of these feeders were made to evaluate their reliability levels. The results show that mean SAIDI for Kaduna and Kano distribution systems were 0.0012 and 0.0007, respectively. This shows that Kano distribution systems is comparatively less reliable compared to Kaduna distribution systems due to prolonged period of interruptions recorded on most of the feeders attached to the systems. The mean SAIFI for Kaduna and Kano distribution systems were 0.0032 and 0.0.0016, respectively. This indicates that most of the customers attached to Kaduna distribution system feeders were served adequately compared to Kano distribution system feeders even though most of the faults recorded on Kaduna were cleared on time, thus making Kano distribution system to be relatively less reliable. Kaduna and Kano distribution systems have mean CAIDI contributions of 0.0054 and 0.0032, respectively. The result shows that fewer of the customers attached to Kano distribution system were adequately served, as a result of prolonged interruptions recorded on the system, while many of the customers attached to Kaduna distribution feeders were adequately served, which is evident from low level of faults on the distribution system. The findings from this study provide a basis for power system engineering for planning and maintenance strategies.*

***KEYWORDS:*** *Feeder's Contributions, Reliability Indices, SAIDI, SAIFI, CAIDI, Feeders, Distribution Systems*