

A Modified k-out-of-n:G System Applied to Human Resources Management

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In this presentation a stochastic model for human resources management in an organisation is developed. This is done by modifying the thoroughly studied reliability system known as the k-out-of-n:G system. The model considered is a homogeneous system in the system that the type of work each employee has to do remains the same. Employees leave the organisation due to retirement, resignation or even death. These are incorporated to represent workforce depletion and a recruitment process governed by the N-policy is employed to restore and maintain the required staff level. The system operates efficiently only if at least k of the n positions are occupied by employees. Unlike the classical k-out-of-n:G system, in the proposed model, the organisation continues to function with reduced efficiency when the workforce falls below k. In addition, efficiency declines progressively as the number of employees decreases in the order: $k-1 \rightarrow k-2 \rightarrow \dots \rightarrow 1$. The maximum time duration of each employee in the organisation (starting from joining until retirement) is modelled using Cox distribution to capture the possibility of departure at the end of any phase of their employment in the organisation due to resignation, death or retirement. Vacant positions in the organisation are filled through a recruitment process governed by the N-policy. This process consists of three sequential stages-- NOTIFICATION/ADVERTISEMENT OF VACANCIES, RECEIVAL AND SCRUTINY OF APPLICATIONS AND FINALLY, THE INTERVIEW AND SELECTION PROCESS. The time taken to complete each stage is assumed to follow an exponential distribution. We assume that sufficient eligible candidates are available such that, upon completion of the recruitment process, the organisation will have n employees including both the existing staff and the newly recruited employees.

We analyse the long run behaviour of the system. Various performance measures are derived and the influence of system parameters on key performance measures is demonstrated numerically. Furthermore, we consider an associated optimization problem.