Preface

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Organisations must provide high quality products at relatively low cost because of high competition in markets. Product quality and cost are related, and they are influenced by several functions. While maintenance is a vital function in keeping production of high quality products at a reasonable cost, maintenance activities cost an organisation a high percentage of its total operational budget. A maintenance management system, therefore, is required for efficient control of these activities. Maintenance is defined as the combination of activities and actions required to control and supervise a system, or a component to perform its intended functions. Maintenance returns a system to its state before breakdown, or even prevents a breakdown in the first place. Maintenance is addressed through several policies: corrective, preventive, and mixed (corrective and preventive). Corrective maintenance is unplanned maintenance action required to repair a system after breakdown has occurred; the system is not functioning while being repaired. Preventive maintenance is planned and conducted to prevent an occurrence of a breakdown. Mixed policy is used to perform preventive maintenance once corrective maintenance is required. Other maintenance policies are considered philosophical and address a comprehensive perspective with multidisciplinary teams. The goal of this special issue is to address and publish the latest articles on a variety of topics related to maintenance models and management.

In the first article entitled 'Maintenance planning and management: a state of the art survey' by Smadi and Kamrani, a comprehensive review of the maintenance planning research is presented. In the second article entitled 'The heuristics of effective maintenance policy under the given availability', Wongmongkolrit and Rassameethes proposed a new model that will reduce the maintenance cost under the given certain availability. It is based on a methodology of sharing maintenance downtime between

preventive and corrective which emphasises on repair rate, maintenance downtime and maintenance actions under the given availability. 'Optimal burn-in time and imperfect maintenance strategy for a warranted product with bathtub shaped failure rate' is the tile of the third article. In this article, Shafiee and Asgharizadeh proposed an optimisation model to determine the optimal burn-in time and optimal imperfect preventive maintenance strategy that minimises the total mean servicing cost of a warranted product with an age-dependent repair cost. Al-Shayea is the author of the fourth article entitled 'Best period of time for performing shutdown maintenance'. In this article, a mathematical model is developed for finding the best period for performing shutdown maintenance. It is based on determining the period of time during the predetermined time horizon for performing shutdown maintenance activities in which the maintenance cost and the loss of production that is caused by shutdown maintenance are in their lowest levels. In the fifth article entitled 'Hybrid minimal repair and age replacement policy for two-dimensional warranted products' and authored by Husniah, Pasaribu, Halim and Iskandar, a hybrid minimal repair and age replacement policy for a repairable product sold with a two-dimensional non-renewing failure replacement warranty is investigated and analysed. In this article, some insights regarding the structural properties of the optimal solution for the two-dimensional warranty are discussed and in a special case the results agree with the known one-dimensional warranty case. In the last article by Ozbek, Zeid and Kamarthi, a Q-learning algorithm is develop to come up with a grouping policy that would reduce set up costs and increase the uptime efficiency of a flow line manufacturing system, which consists of several inter-dependent machines operating in sequence. The title of this article is 'A Q-learning-based adaptive grouping policy for condition-based maintenance of a flow line manufacturing system'.

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