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Biographies

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Imad Alsyouf is an associate professor of Industrial Engineering, employed by University of Sharjah, UAE. He is the founder and coordinator of the Sustainable Engineering Asset Management (SEAM) Research Group. He has produced more than 30 conference and journal papers. He has about 27 years of industrial and academic experience in various positions in Jordan, Sweden and UAE. His research interests include reliability, quality, maintenance, and optimization. He has developed and taught more than 25 post and undergrad courses. He delivered training courses in Kaizen, TQM, and organizational excellence.

Appendix 1

Table 1: A Summary of the Literature review on SPC-Maintenance Models

Integration Method/Solution Procedure	Publication	Quality Control Chart Type / SPC Tool						Economic	Application Quality Monitoring Purpose	Maintenance Policy Employed
	(Author(s), Year)	X-Bar Chart	MEWMA	EWMA	Time-Between-Events	Adaptive Shewart	Other			
Hooke and Jeeves algorithm	(Abouei Ardakan et al., 2015)		x					Yes	Production System Process Quality - Equipment Deterioration	Planned Maintenance Reactive Maintenance
Dancun (1956) approach with Maintenance Cost Parameters	(Pandey et al., 2011)	x						Yes	Production System Quality Characteristic	Block Replacement Policy
Markove Chain (7 States)	(Panagiotidou et al., 2009)					x		Yes	Production System Process Quality	Condition Based Maintenance
Dancun (1956) approach with Maintenance Cost Parameters	(Ching et al., 2009)	x						Yes	Production System Product Quality	Preventive Maintenance
Basic Input-Output Integration	(Azizi, 2015)						x SPC	No	Production System Product Quality, Productivity, etc	Autonomous Maintenance

	Publication	Quality Control Chart Type / SPC Tool	E		
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Integration Method/Solution Procedure	(Author(s), Year)	X-Bar Chart	MEWMA	EWMA	Time-Between-	Adaptive Shewart	Other		Application Quality Monitoring Purpose	Maintenance Policy Employed
Proposed Framework of integrated variables, and models	(Lu et al., 2016)						x Quality Improvement	Yes	Production System - Product Quality- Machine Reliability	Preventive Maintenance Decision Making
discrete-time Markov Chain	(Xiang, 2013)	x						Yes	Production System Product Quality	age based preventive maintenance (Imperfect)
Combined Mathematics and Simulation Based Modeling framework	(Bouslah, 2017)						X Quality Control (Inspection)	Yes	Production System Product Quality - Machine Reliability	Age Replacement Policy
Methodological Approach (Procedure)	(Lesage, et al., 2012)	x						Yes	Production System Quality Parameters	Quality Based Maintenance Policy
Optimization of different models and the combination model	(Panagiotidou, 2012)						X General Standard Control Chart	Yes	Production System Quality Parameters	Preventive Maintenance Corrective Maintenance Minimal Maintenance

	Publication	Quality Control Chart Type / SPC Tool	Econ	Application Quality	
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Integration Method/Solution Procedure	(Author(s), Year)	X-Bar Chart	MEWMA	EWMA	Time-Between-	Adaptive Shewart	Other		Monitoring Purpose	Maintenance Policy Employed
Mathematical Model	(Deloux, 2009)						X (SPC) Classical Control Chart	Yes	Production System Quality Parameter	Condition Based Maintenance
bi-objective optimization: Quality and maintenance-related cost minimization criterion along with a long-run expected availability maximization criterion and constraints.	(Tasias, & Nenes, 2017)						X	Yes	Production System Process Quality	Preventive Maintenance Corrective Maintenance
General framework of integration between quality inspection and maintenance	(Kurniati et al., 2015)						X Quality Inspection	No	Production System Quality Characteristic	Preventive Maintenance Corrective Maintenance
Genetic algorithm	(Yin et al., 2015)	X						Yes	Production System Product Quality	Predictive Maintenance Preventive Maintenance Corrective Maintenance
Continuous time Markov Chain (5 States)	(Liu et al., 2013)	X						Yes	Production System Product Quality-Machine Deterioration	Condition Based Maintenance

	Publication	Quality Control Chart Type / SPC Tool	Econ Quality	Application Quality
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Integration Method/Solution Procedure	(Author(s), Year)	X-Bar Chart	MEWMA	EWMA	Time-Between-	Adaptive Shewart	Other		Monitoring Purpose	Maintenance Policy Employed
Optimization using pattern search technique of Hooke and Jeeves	(Ben-Daya, 1999)	x						Yes	Production System Product Quality	Preventive Maintenance
Taguchi loss functions	(Chen & Yu, 2011)	x						Yes	Production System Product Quality	Preventive Maintenance
Genetic algorithm	(Charongrattanasakul, and Pongpullponsak, 2011)			x				Yes	Production System Product Quality	Planned Maintenance Reactive Maintenance Compensatory Maintenance
Hooke and Jeeves Search Technique - Mathematical Models	(Lee, & Rahim, 2001)	x						Yes	Production System Product Quality	Age Replacement Policy
Hooke and Jeeves pattern search algorithm	(Linderman et al., 2005)	x Other Control Charts can also be used						Yes	Production System Equipment Deterioration	Planned Maintenance Reactive Maintenance

	Publication	Quality Control Chart Type / SPC Tool	ECON	Application Quality	
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Integration Method/Solution Procedure	(Author(s), Year)	X-Bar Chart	MEWMA	EWMA	Time-Between-	Adaptive Shewart	Other		Monitoring Purpose	Maintenance Policy Employed
Simulation Optimization Approach	(Cassady et al., 2000)	x						Yes	Production System Product Quality	Age Replacement Policy
Mathematical Model (6 Scenarios)	(Mehrafrooz , & Noorossana, 2011)	x						Yes	Production System Product Quality	Planned Maintenance Reactive Maintenance Compensatory Maintenance
Grid-search approach	(Zhou, & Zhu, 2008)	x Other Control Charts can also be used						Yes	Production System Equipment Deterioration	Planned Maintenance Reactive Maintenance Compensatory Maintenance
Mathematical Model Framework (8 scenarios) Taguchi loss function	(Zhong and Ma, 2014)						x Shewart individual-residual joint control chart	Yes	Production System Equipment Deterioration	Planned Maintenance Reactive Maintenance Compensatory Maintenance
Procedure	(Alsyof et al., 2016)				x			No	Repairable Systems System Reliability	Age Replacement Policy
Hooke and Jeeves Search Technique	(Ben-Daya and Rahim, 2000)	x						Yes	Production System Product Quality	Preventive Maintenance
Mathematical Model	(Michael & Xie., 2008)				x				Maintained Systems System Lifetime	Planned Maintenance Reactive Maintenance

