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Queueing Theory an Index Factor for Production Inventory Control in Automotive Industry—A Review

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Abstract

In this paper, various approaches to inventory control within the automotive industry were reviewed using queueing theory. Different models used in past literature were stated and the model considered to be most effective in this review is dock management modeling. This model was used to analyze inventory control and how effectively automotive industries can minimize inventory by getting the component needed in the assembly line just in time, this helps to reduce additional costs for warehouse maintenance and capital tied down in form of excess inventory. Analytical and simulation models are the mathematical models that are considered in this review as they are used in several papers by different authors.

Keywords

Queueing theory Index factor Inventory Automotive Model

Notes

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References

1. 1.

Balaji K, Kumar VSS (2014) Multicriteria inventory ABC classification in an automobile rubber components manufacturing industry. Procedia CIRP 17:463–468CrossRefGoogle Scholar

2. 2.

Başak Ö, Albayrak YE (2015) Petri net based decision system modeling in real-time scheduling and control of flexible automotive manufacturing systems. Comput Ind Eng 86:116–126CrossRefGoogle Scholar

3. 3.

Bhatnagar R, Lin B (2018) The joint transshipment and production control policies for multi-location production/inventory systems. Eur J Oper ResGoogle Scholar

4. 4.

Bruniaux R, Pierreval H, Caux C (1999) Simulating supply chains with system dynamics. In: Proceedings of the ESS'99 European simulation symposium, Nuremberg, Germany, 26–28 Oct, pp 209–213Google Scholar

5. 5.

Bruniaux R (2000) Simulation continue de réseaux de sites industriels: application aux chaines logistiques dans le secteur automobile. Ph.D. Dissertation, in French, Université Blaise Pascal, Clermont-Ferrand, FranceGoogle Scholar

6. 6.

Bruniaux R, Caux C (2007) A continuous simulation approach for supply chains in the automotive industry. Simul Model Pract Theory 15(2):185–198CrossRefGoogle Scholar

7. 7.

Boysen N, Emde S, Hoeck M, Kauderer M (2015) Part logistics in the automotive industry: decision problems, literature review and research agenda. Eur J Oper Res 242(1):107–120MathSciNetzbMATHCrossRefGoogle Scholar

8. 8.

Dalmijn WL (1990) Practical applications of eddy current separators in the scrap recycling industry. In: van Linden JHI, Stewart DL Jr, Sahai Y (eds) Proceedings of the second international symposium on recycling of metals and engineered materials, pp 303–314Google Scholar

9. 9.

Groover MP (1987) Automation, production systems, and computer integrated manufacturing. Prentice-Hall, Englewood Cliffs, pp 36–40, 404–407Google Scholar

10. 10.

Ho C (1989) Evaluating the impact of operating environments on MRP system nervousness. Int J Prod Res 27:1115–1135CrossRefGoogle Scholar

11. 11.

Michalos G, Makris S, Papakostas N, Mourtzis D, Chryssolouris G (2010) Automotive assembly technologies review: challenges and outlook for a flexible and adaptive approach. CIRP J Manufact Sci Technol 2(2):81–91CrossRefGoogle Scholar

12. 12.

Hu SJ, Zhu X, Wang H, Koren Y (2008) Product variety and manufacturing complexity in assembly systems and supply chains. CIRP Ann Manuf Technol 57(1):45–48Google Scholar

13. 13.

Lang S, Reggelin T, Wunder T (2017) Mesoscopic simulation models for logistics planning tasks in the automotive industry. Procedia Eng 178:298–307CrossRefGoogle Scholar

14. 14.

Marsudi M, Shafeek H (2013) Production line performance by using queuing model. IFAC Proc Vol 46(9):1152–1157CrossRefGoogle Scholar

15. 15.

Marsudi M, Dzuraidah AW, Che Hassan CH (2009) Application of spreadsheet and queuing network model to capacity optimization in product development. World Acad Sci Eng Technol 34:1068–1071Google Scholar

16. 16.

Salawu EY, Okokpujie IP, Afolalu SA, Ajayi OO, Azeta J (2018) Investigation of production output for improvement. Int J Mech Prod Eng Res Dev 8(1):915–922Google Scholar

17. 17.

Afolalu AS, Enesi YS, Kehinde O, Samuel UA, Ikechi VI, Remilekun RE (2018) Failure mode and effect analysis a tool for reliability evaluation. Eur J Eng Res Sci 3(4):65–68CrossRefGoogle Scholar

18. 18.

Salawu EY, Ajayi OO, Inegbenebor AO, Afolalu SA, Ongbali SO (2018) Pareto analysis of product quality failures and cost effects in bottling machines—a lean thinking solution for alcohol industry. Int J Mech Eng Technol 9(11):2380–2388Google Scholar

19. 19.

Afolalu SA, Ayuba SU, Ihebom IV, Elewa RR, Oluyemi K (2018) Role of reliability management tools and documentations—a review. Glob J Eng Sci Res Manage 5(3):39. ISSN 2349-4506Google Scholar

20.20.

Meyer A, Sejdovic S, Glock K, Bender M, Kleiner N, Riemer D (2017) A disruption management system for automotive inbound networks: concepts and challenges. EURO J Transp Logist 1–32Google Scholar

21.21.

Mula J, Poler R, García-Sabater JP, Lario FC (2006) Models for production planning under uncertainty: a review. Int J Prod Econ 103(1):271–285CrossRefGoogle Scholar

22.22.

Pearl J (1986) Fusion, propagation and structuring in belief networks. Artif Intell 29(3):241–288MathSciNetzbMATHCrossRefGoogle Scholar

23.23.

Lee YH, Cho MK, Kim SJ, Kim YB (2002) Supply chain simulation with discrete continuous combined modeling. Comput Ind Eng 43(1–2):375–392CrossRefGoogle Scholar

24.24.

Rabelo L, Magdy H, Lertpattarapong C (2004) Analysis of supply chains using system dynamics, neural networks and eigenvalues. In: Proceedings of the 2004 winter simulation conference, Dec, Washington, DC, USAGoogle Scholar

25.25.

Abioye AA, Atanda PO, Abioye OP, Akinlabi SA, Akinlabi ET, Bolu CA, Afolalu SA, Ajayi OO, Ohijeagbon IO (2018). A review on automotive industries and foundries in Nigeria. In: IOP conference series: materials science and engineering, vol 413, no 1. IOP Publishing, p 012003Google Scholar

26.26.

Ramírez-Granados M, Hernàndez JE, Lyons AC (2014) A discrete-event simulation model for supporting the first-tier supplier decision-making in a UK's automotive industry. J Appl Res Technol 12(5):860–870CrossRefGoogle Scholar

27.27.

Remiel FM, Cauvin A, Ferrarini A (2014) Conceptual design and simulation of an automotive body shop assembly line. IFAC Proc Vol 47(3):760–765CrossRefGoogle Scholar

28. 28.

Askin RG, Mitwasi MG, Goldberg JB (1993) Determining the number of kanbans in multi-item just-in- time systems. IIE Trans 25(1):89–98CrossRefGoogle Scholar

29. 29.

Sethi SP, Yan H, Zang Q (2002) Optimal and hierarchical controls in dynamic stochastic manufacturing systems: A survey. Manuf Serv Oper Manage 4:133–170CrossRefGoogle Scholar

30. 30.

Shin J, Kim S, Lee JM (2015) Production and inventory control of auto parts based on predicted probabilistic distribution of inventory. Dig Commun Netw 1(4):292–301CrossRefGoogle Scholar

31. 31.

Shiina T, Birge JR (2003) Multistage stochastic programming model for electric power capacity expansion problem. Jpn J Ind Appl Math 20:379–397zbMATHCrossRefGoogle Scholar

32. 32.

Spengler T, Ploog M, Schroter M (2003) Integrated planning of acquisition, disassembly and bulk recycling: a case study on electronic scrap recovery. OR Spectrum 25:413–442zbMATHCrossRefGoogle Scholar

33. 33.

Ajayi OO, Agarana MC, Akinwumi II, Okokpujie PI, Salawu EY, Abioye AA, Afolalu AS, Leramo RO (2019) Modelling rate of traffic-induced building vibrations in Sango-Ota, Nigeria: an assumption based analysis. WIT Trans Built Environ 182:303–313Google Scholar

34. 34.

Weiss EN, Tucker C (2018) Queue management: elimination, expectation, and enhancement. Bus Horiz 61(5):671–678CrossRefGoogle Scholar

35. 35.

Williams JAS, Wongweragiat S, Qu X, McGlinch JB, Bonawi-tan W, Choi JK, Schiff J (2007) An automotive bulk recycling planning model. Eur J Oper Res 177(2):969–981zbMATHCrossRefGoogle Scholar

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