AUSTRALIAN JOURNAL OF BASIC AND APPLIED SCIENCES

ISSN:1991-8178 EISSN: 2309-8414
Journal home page: www.ajbasweb.com

Basic Structural Components in Optimization Model and Shipping Routing

[1]Pravendra Tyagi and [2]Prof G.Agarwal

[1]Ph.D. Research scholar, MNIT Jaipur
[2]Professor, MNIT Jaipur, agarwa.

Address For Correspondence:
Pravendra Tyagi, Ph.D. Research scholar, MNIT Jaipur.
E-mail: indiakt@rediffmail.com

ARTICLE INFO

Article history:
Received 12 February 2016
Accepted 12 March 2016
Available online 20 March 2016

Keywords:
Shipping, optimal, enhancement, prosperity, structural

ABSTRACT

Moving towards the vision for preparing optimal intra shipping routing model, which includes minimizing distance between nodes, delivery time and completely utilization of ship capacity resulting in cost reduction, therefore it becomes mandatory to have basic conceptual aspects about resources characteristics of shipping routing, also knowing about structural components of optimization for implementing key strategies in obtaining optimum routing among all defend supply nodes and delivery nodes. Paper reviews the contribution of eminent researchers in the core province of optimization and shipping routing elements encompassing the resources demand, routing and ship network features.

INTRODUCTION

Optimal use of network capacity may result in increased profit and reduced operating cost by following flexible operating environment.

1.1Special Consideration in Optimization:

[1] Optimization focuses on efficiency by the use of predictive and statistics analysis followed by mathematics and logic to the pursuit of objective efficiency.
[2] An optimization model is set of inputs cost, assumptions, demands, constraints, goals, resources' and preferences.
[3] Optimization is used in manufacturing, transportations and logistics, financial services, utilities and natural resources and telecom industries.

1.2.Structural Components of an Optimization model:

- Input Elements available:-
- Manpower of various skills.
- Various models of transport
- Machines and tools
- Inventories (WIP, Raw Material ,Finished goods)
- Tangible and Intangible demands to be filled or to be performed.
- Under these structural components of optimization, products are built based on customer orders and services are performed as per customer requirement.
  Heuristics, fleet-group of ships sailing together, group of aircrafts operating together.

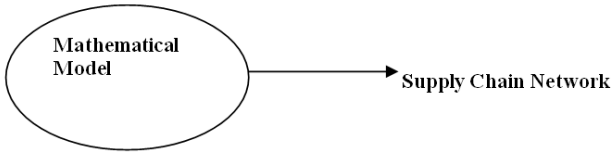
To Cite This Article: Pravendra Tyagi and Prof G.Agarwal., Basic Structural Components in Optimization Model and Shipping Routing. ***Aust. J. Basic & Appl. Sci.,*** *10(1): 685-688, 2016*

Australian Journal of Basic and Applied Sciences, 10(1) January 2016, Pages: 685-688

Operating cost elements: Operating cost includes –Raw material cost with supply cost, labor rate, inventory holding cost, wear and tear cost.

Operating constraints and customer preferences: --Limitation and resources which are needed to fulfill the demand and priority given by the customer towards delivery comes in category of operating constraints and customer preferences.

Inputs: Outputs **Resources** available (Schedule or plan)



Structural components of optimization model:

II.Business oriented value of optimization:

As Business value is concerned ,optimization play dual purpose for business planner as it provide better estimation of business productivity and operational options and helps in generating optimal plans and schedules.

2.1.Optimization contribution towards industry:

Specifically optimization help business planner in following aspects:

i) Reducing operating costs
ii) Increase resources utilization
iii) Prompt production and delivery
iv) Provide future based decision
v) Minimized inventory
vi) Risk management
vii) Increased margins
viii) Employee satisfaction

Table 1: Cost Vs Contraints.

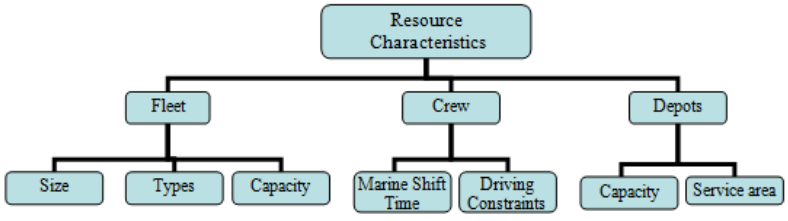
Cost	Constraints	Goals
Production	Production capacity	
Inventory carrying	Transportation capacity	Minimized cost
Transportation between location	Lot size	
Labor overtime	Safety stock requirement	Maximize customer services
Non- delivery Penalties	Product Priorities Customer Priorities	

III. Ship Routing:

- Ship involves major investments and high operating cost reduction through good planning and by utilizing fleet belter contribution.
- Each ship in a fleet comprises a set of attributes like capacity, fuel consumption, service speed, loading /unloading charges.
- Cargo is also associated with some attributes as loading and unloading port, quantity products time window for loading and unloading, income.
- Routing and scheduling subsumes the problem of goods distribution to costumer location, effective management of fleet to make the economic transportation.

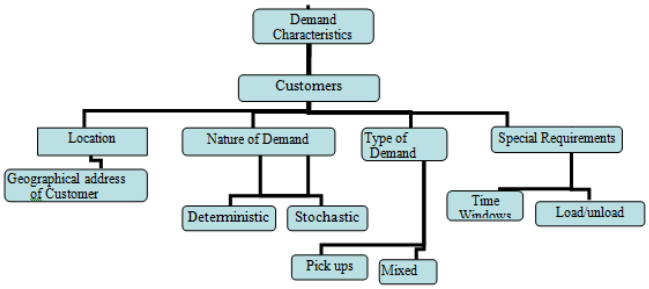
Elements included in routing and scheduling:--

a) Resource Characteristics:

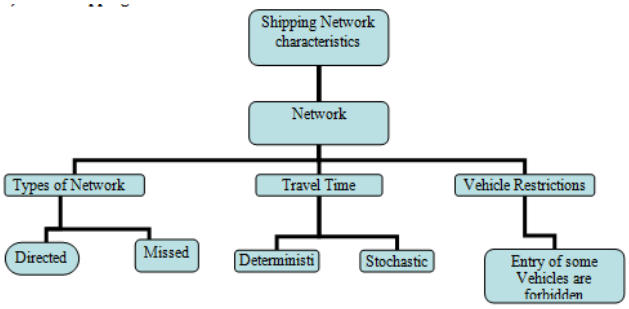


Australian Journal of Basic and Applied Sciences, 10(1) January 2016, Pages: 685-688

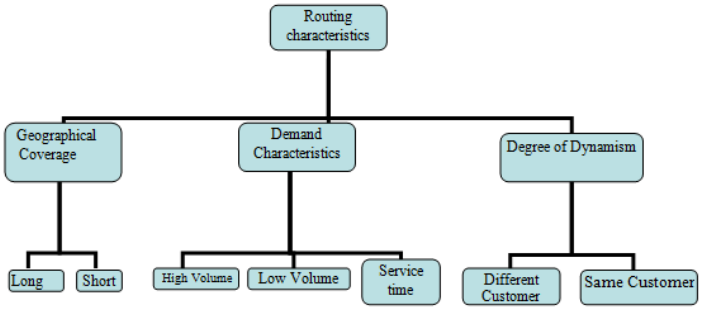
b) Demand characteristic:



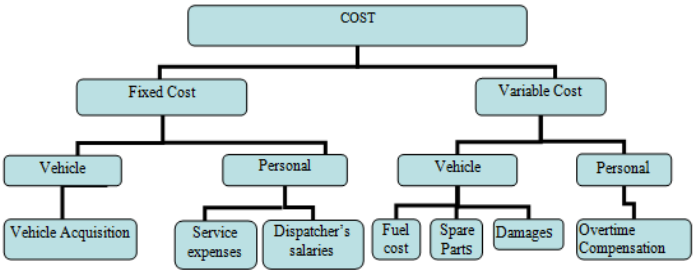
c) Shipping Network Characteristics:



d) Routing Characteristics:



e) Cost Associated with Shipping and scheduling:



Conclusion:

Efforts have been made in paper to explore the foundational knowledge regarding shipping routing model followed by optimization by reviewing the valuable contribution of previous researchers in field of costs elements in vehicle routing problem with an objective function, which may be the minimizing cost, which includes fixed cost and variable cost with consideration of routing, demand, resource and shipping network characteristics to avoid the interruption in shipping logistics management.

REFERENCES

Ioannis, Warren, 1992. Shipment Routing Algorithms with Tree Constraints, Journal of Transportation Science, 26(3).

Iris F.A., Vis, Rene de Koster, 2003. Transshipment of Containers at a Container Terminal An Overview, European Journal of Operational Research, 147: 1–16.

Amir Azaron, Farhad Kianfar, 2003. Dynamic Shortest Path in Stochastic Dynamic Networks:Ship Routing Problem, European Journal of Operational Research, 144: 138–156.

Mabel Chou, MiaoSong and Chung-Piaw, 2004. Inventory-Routing Problem in Sea Freight: Direct Versus Transshipment ModelSanja Bauk, Natasa Kova. Modeling ship's Route by the Adaptation of hopfield -tank tsp neural algorithm, Journal of Maritime Research, 1(3): 51-66.

Emad Elbeltagi, Tarek Hegazyb, Donald Grierson, 2005. Comparison among five evolutionary based optimization algorithms, Advanced Engineering Informatics, 19: 43–53

Koichi Shintai, 2007. The Container Shipping Network Design Problems with Empty Container Repositioning. Transportation Research Part E., 43: 39-59.

Xiaowei Yang, David Clark, and Arthur W. Berger, 2007. A New Inter-Domain Routing Architecture, IEEE/ACM Transactions On Networking, 15(4).

Apaydin, O., M.T. Gonullu, 2007. Route Optimization for Solid Waste Collection, Global NEST Journal, 9(1): 6-11.

Luo Junhai, Xue Liu,Ye Danxia, 2008. Research on Multicast Routing Protocols for mobile ad-hoc networks, The International Journal on Computer Networks, 52: 988–997.

Lector vaidotas, 2008. Route Optimization Application in Waste Collection System, Environtal Engineering Department, Vilnius Gediminas Technical University.

Zhongzhen Yang, Kang chen, 2010. Optimization of Shipping Network of Trunk and Feeder Lines for Inter-Regional and Intra-Regional Container Transport, Journal of the Eastern Asia Society for Transportation Studies.

Chitra, C. and P. Subbaraj, 2010. A Nondominated Sorting Genetic Algorithm for Shortest Path Routing Problem, International Journal of Electrical and Computer Engineering, 5(1).

Rakesh Kumar, Mahesh Kumar, 2010. Exploring Genetic Algorithm for Shortest Path Optimization in Data Networks, Global Journal of Computer Science and Technology, 10(11): 8-12.

Calduwel Newton, P., L. Arockiam, 2010. Route Optimization Mechanisms for Internet Applications in Mobile Networks: A Survey, International Journal of Future Generation Communication and Networking, 3(3).

Ming-Cheng Tsou and Chao-Kuang Hsueh, 2010. The Study of Ship Collision Avoidance Route Planning by Ant Colony Algorithm, Journal of Marine Science and Technology, 18(5): 746-756.

Payman Jula, Robert C. Leachman, 2011. A Supply-Chain Optimization Model of the Allocation of Containerized Imports from Asia to the United States, Transportation Research Part E., 47: 609–622.

Mads, K., Jepsen, Berit Loftstedt, Christian E.M. Plum, David Pisinger and Mikkel M. Sigurd, 2011. A Path Based Model for a Green Linear Shipping Network Design Problem, Proceeding of the International multi Conference of Engineers and Computer Scientist.

Xueping Wang, Lei Wu and Mingwang Dong, 2011. Modeling and Accomplishment of Loading-and-Unloading Equipment Optimum Allocation System at Bulk Terminal, International Journal of Modern Education and Computer Science, 4: 1-9.

Saluka Kodithuwakku, 2012. Container Yard Route Planning System, International Journal of Advanced Research in Computer Science and Software Engineering, 2(1).

Oddo, P., N. Pinardi, G. Mannarini & G. Coppini, 2013. A Prototype of Ship Routing Decision Support System for an Operational Oceanographic Service, The International Journal on Marine Navigation and Safety of Sea Transportation, 7(1).

Szlapczynska, J., Multicriteria, 2013. Evolutionary Weather Routing Algorithm in Practice, The International Journal on Marine Navigation and Safety of Sea Transportation, 7(1).

Cesar Ducruet, Igor Lugo, 2013. Cities and Transport Networks in Shipping and Logistics Research, The Asian Journal of Shipping and Logistics Research, 29(2): 145-166.

Sopnamayee Acharya, 2013. Vehicle Routing and Scheduling Problems with time window constraints Optimization Based Models, International Journal of Mathematical Sciences & Applications, 3(1).

Liu Ai-zhen, Chen Li-yun, Wang Yin-long, Wang Lu, 2013. A Quantity Optimization Method on Integrated-Loading and-Unloading-Missile Vehicles, TELKOMNIKA, 11(2): 623-629.

Raul Pino, Alberto Gómez, José Parreño, 2013. Application of Genetic Algorithms to Container Loading Optimization, International Journal of Trade, Economics and Finance, 4(5).

Srecko Krile, Application of the Minimum Cost Flow Problem in Container Shipping, University of Dubrovnik,Department of Computing.