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ijirset@gmail.com

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A Review on Economical Cellular Tower Construction & Effective Application of Supply Chain Management

Supriya U. Khilare¹, Prof. K. H. Ghorpade²

PG Student, Department of Civil Engineering, Trinity Academy of Engineering, Pune, Maharashtra, India¹

Assistant Professor, Department of Civil Engineering, Trinity Academy of Engineering, Pune, Maharashtra, India²

ABSTRACT: This paper aim to provide Alternative solution over conventional methods for ground base cellular tower and supply chain management process for cost & time reduction. Construction process of Square lattice ground base cellular tower & supply chain management is costly; time consuming & So its need to reduce the time, cost, man power & machineries with alternative solution.

KEYWORDS: Alternative solution for cellular tower, reduce construction cost, delay in time.

I. INTRODUCTION

India is most infra developed country; the telecom industries is one of them & have been perceived the world over as a significant device for the financial improvement of a country. Cell phone technology has several advantages and has grown rapidly in the last decade. In India, there are nearly 90 crores cell phone subscribers and around 5.2 lakhs cell phone towers. A self-supporting structure constructed from steel lattice, Angular steel, reinforced concrete, built to support one or more antennas designed to transmit or receive digital, microwave, cellular or similar forms of wireless electronic communication (Ref. fig.1) & Supply chain management it goes into improving the raw materials it needs to make a product or service and deliver it to customers (Ref. fig.2).



Fig.1 Ground Base Cellular Tower



Fig.2 Inventory in Warehouse

Now a day's construction of ground base cellular tower & supply chain management is costly, time delay & poor management process. Its required heavy machineries, large manpower, heavy materials, high maintenance & it's expensive & difficult to transportation. So before construction of ground base cellular tower to check the feasibility. Mainly focused on cellular tower superstructure for replacement of unnecessary steel sections & its needs to reduce the time & cost on supply chain management process.

II. LITERATURE REVIEW

“Telecommunication Cell Tower Most Common Alternatives Overview” American Journal of Civil Engineering (2017). Al-jassani Azhar Abdulkareem Majeed & Al-suraifi Inam Jabbar Hraba.

This paper presents the alternatives of the construction of cellular tower. Authors working on three types of cellular tower like Lattice towers, Monopole and Guyed mast tower. Analyses the torsion effect for selected towers at the tower top less than 0.5 degree utilized in a rural zone close of Budapest City, Hungary dependent on the most widely recognized control viewpoints (Aesthetical, Economical and Statically aspect) which impacts the dynamic and the determination cycle. They show each option has its features, benefits and Specific restrictions of use. The came about choice dependent on the introduced study was that the most proper alternatives as indicated by the predetermined data are the grid towers (Square and Triangular) and they select the Monopole which have the right to be chosen for additional examinations.

“Effect of Rooftop Mounted Telecommunication Tower on Design of the Building Structure”. International Research Journal of Engineering and Technology (IRJET) (2017). Faria Aseem, Abdul Quadir.

This paper represent the effects of Roof top tower mounted on commercial building of plot area 144 sq. meter & height of tower is 12 m. They are described the specifications of Tower & Building. Authors shown the calculation of assigning beam & column properties, Rendering of beams & columns, total estimation of tower, 3D view of whole structure & total plates of slab. Also shown the steel & concrete design by using STAAD PRO software with include live load, Wind load & dead loads.

“Comparative Analysis of Steel Telecommunication Tower subjected to seismic & wind Loading” Civil Engineering and Urban Planning: An International Journal (CiVEJ). Keshav Kr. Sharma, S.K. Duggal, Deepak Kumar Singh, A.K. Sachan.

This paper mainly focused on seismic & wind loading in steel telecommunication tower. Authors have worked on comparative analysis for different heights of towers & details of the modeling of the steel telecommunication tower with the different bracing patterns for Wind zones I to VI & Earthquake zones II to V of India. The major loads consider in for designs (like wind load, seismic load, platform load, self-weight of tower, steel ladder load, antenna load etc.) Also studies have been carried out by considering earthquake & wind loads.

“Glass Fiber Reinforced Polymer(GFRP) Rebar for Sustainable Infrastructure” (2016). Borna Hajimiragha.

In this thesis work done on comparison of steel & glass fiber reinforced polymer for sustainable infrastructure with details of codes, design & basis slandered parameters. They were studies based on the 10 different types of infra-structures. Authors conducted tests on steel & GFRP like corrosion resistance, bonding strength, ease of cutting, fire rated, fatigue strength, thermal conductivity & non conductivity, thermal expansion etc. Also shows stress & strain chart & transportation cost of the selected material. This paper highlighted the cost of the material.

“A Weighted Multi-Objective Mathematical Model for Cell Scheduling and Environmentally Sustainable Supply Chain Network” Science Direct Procedia Manufacturing (2019). Roohollah Younes Sinakia, zadeh Sadeghia, Gursel Suera.

This paper aims to reduce the cost & tome. This paper author presents a mixed-integer programming model to integrate environmentally sustainable supply chain network (SCN) and manufacturing scheduling. The products are transported by the appropriate mode of transportation that minimizes transportation cost and meets the customer due date. The main objective of the model is to maximize the total profit in the network, the second objective is to minimize the environmental impact (EI) of using an alternative of transportation mode also minimize the probability of tardiness for shipping the products. Process to obtain the satisfaction level in the network, experiment is conducted. Outcomes helps decision makers to find the most desirable trade-off between total profit, environmental impact and the probability of tardiness.

“Evaluation of the Factors Influencing Time and Cost Overruns in Telecom Tower Construction in Ghana” Civil and Environmental Research (2012). Humphrey Danso, John Kobina Antwi.

This paper involved survey of self-administered structure. Authors studies on five types of telecom towers like guyed tower, Cell on wheels’ tower, reinforced concrete tower, self- standing telecom tower structure & mobile telecom tower. In this paper authors prepared questionnaires’ & collect responses & then solve the questionnaires’ with RII method & found issues. In final result they were found 15 major factors for time influence & 14 factors for cost influence with using six sigmas to improve quality & productivity of telecom tower construction.

“Sustainability and digitalization in supply chains: A bibliometric analysis “Uncertain Supply Chain Management (2019). Andrés Muñoz-Villamizara, Elyn Solanoa, Carlos Quintero-Araujoa and Javier Santos.

This paper presents a bibliometric analysis on sustainability & digitalization in supply chain management with the focus on investigation & interrelations. Digitalization is affecting pretty much every part of individuals' way of life

and is extraordinarily influencing store network measures. The analysis is on sample basis. The area covered in analysis is engineering, energy, computer science & business, accounting & management. In this research they found gaps in body of knowledge. so they are strictly focus on scientific research on sustainability & digitalization in supply chains. The outcomes may have prosecuted areas like the arranging, planning, running and distributing of future examination on this point.

“Optimal supply chain resilience with consideration of failure propagation and repair” logistics Transportation Research Part. Nils Goldbeck, Panagiotis Angeloudis, Washington Ochieng.

This paper represents the Just in time logistic, global Sourcing & lean production methods to keep reduce the cost & sable business environment also decrease the risk & uncertainties. This paper presents a novel multi-stage stochastic programming model that optimizes pre-disruption investment decisions, as well as post-disruption dynamic adjustment of supply chain operations and allocation of repair resources. The main objective to contribute advancing mathematical modeling methods for cost reduction. Analysis on different supply chain topologies evaluate the models & manufacturing process, repair logistics & Transportation infrastructure in supply chains.

“Alternative Strategies for Dealing with Idle Capacity in Global Supply Chains Procedia Manufacturing” (2019). Benjamin Fryman, Gursel A. Suer, Jue Jiang.

This paper focused on the global supply chain strategy in host market strategy. They worked on three type of cells like dedicated cell, shared cell & remainder cell. authors mainly focus on how to fill idle capacity & manufacturing on demand bases also increase the improvement of resources & their profits using two ways first is the lowering selling price for increase the demand & second is the looking new market foe same product. The main objective of this paper is the comparison between these two strategy with including cost of labour, machine investment & product transportation using case by case to translate the potential profits.

“A robust optimization model for cellular manufacturing system into supply chain management” International journal of Production Economics (2017). Amin Aalae, Hamid Davoudpour.

In this paper, another arithmetical model is introduced for a cellular producing framework into store network plan with work task. This paper considers significant assembling highlights altogether, for example, different plant areas, multi-market assignments with creation anticipating different areas. The proposed model targets limiting the all-out expense of holding destinations, inner cycle of material taking care of, outside transportation, fixed expense for delivering each part in each plant, gear's and work compensations. It is accepted that the requests of items are vulnerability in three situations: idealistic, cynical and typical. Additionally, a hearty advancement approach is then evolved to settle the proposed model and locate the best arrangement. The exhibition of the proposed model is clarified as far as a modern case from a common material and hardware producer.

“SSCM: Service Supply Chain Management” International Journal of Logistics Systems and Management (2010). Dr. Arash Shahin.

This article present the service supply chain management models based on customer & supplier duality. The important element in SSCM is conversion, distribution, knowledge management & mobile workers. They are worked on Unidirectional, Single level bidirectional supply chain & two level bidirectional supply chain. Author shown comparison of service supply chain management & supply chain management. This papers shows impact on service organization by comparing before & after situation of service supply chain management employment with help of Just-in time methods & Supply chain operation reference (SCOR) model for increase in profit & reduce the loss of materials.

“The Use of Camouflaged Cell Phone Towers for a Quality Urban Environment: Koya City as Case Study” UKH Journal of Science and Engineering (2019), Volume 3, No.1. Salah I. Yahya.

This Article present the Telecommunication base stations & describe the components & their uses. Author shows the feasibility of cellulite tower to improve the quality of environment & conduct topographical survey for space of antennas, height of trees in particular area, survey on building heights in tower constructed area because avoided the signal blockage. Also describe the communication tower frequencies & electromagnetic field emission. This papers helps to reduce the environmental effects. In this paper author worked on the structure of tree communication tower to reduce the visual pollution & biological effects, risk on human health as well as overall cost of construction of telecommunication tower.

III. CONCLUSION

As per research on construction of ground based cellular tower area suggests that current condition of construction and supply chain management is need to be changed by all the ways like removal of unnecessary steel sections and lack of proper supply chain. So to reduce extra investment of money on maintenance part there is permanent and low cost cellular tower model is necessary. So to overcome this issue use of Glass fibre reinforced polymer (GFRP) is needed and it will approach to economic than conventional one. Which is strong enough and less in cost Also in this review large amount of issues found in supply chain management in inventory control & transportation process.so we can change the process of inventory management & Transportation with Safety stock method & Vehicle tracking system (VTS) Technique.

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