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DETAILED EXAMINATION OF GANTRY STRUCTURE

Ganesh Kumar.G.[1], Gokul.R.Pillai[2], Anoop.R.[3], Sarath Krishnan.U.[4], Anu.R.[5], Stalin Jose[6]
[1,2,3,4,5,6] UG Scholars, Department of Mechanical Engineering,
PSN College of Engineering and Technology (Autonomous), Tirunelveli, India

Abstract- In the long time past days exceptionally muddled thing is in the business is to convey overwhelming stacked segments and lifting starting with one place then onto the next place, human exertion needs bunches of vitality and it requires more investment for same work, there are numerous enormous and expansive measure of load lifting machine accessible, in that initially began with gantry derrick and gantry cranes with which they convey substantial burdens from one place to other, it works so far when yet it can work just in open place, in little scale enterprises it can't work, amid the period the need is new machine which works in little scale ventures with great time, the changing the era with the new innovation enterprises are wanted to build up the uncommon reason machine which is utilized to lift the overwhelming burdens. Basic examination of the "Gantry Structure" has been completed to locate the mechanical reaction of the structure, subjected to connected burdens and limit conditions. The outcomes incorporate twisted state of the structure, relocations at required areas. Modular examination accomplished for checking the model, Gravity Loading Applied for various position and checked for the twisting of Solid Beam for various position. Enhancement is done to decrease the cost of the structure. The reaction of the structure got by basic investigation utilizing MSC Nastran.

Keywords- ***Gantry, CNC, CAD model, FEM model, NASTRAN***

1. INTRODUCTION

With vivacious advancement in the enterprises like marine designing hardware, send building, aviation and other assembling businesses the handling interest of vast and complex parts progressively every day. Presently days the greater part of the assembling enterprises are related with substantial apparatuses and gear to lead the propel innovation, all things considered "gantry machine" a sort of load lifting hardware is broadly utilizing as a part of the vast majority of the businesses. Research and development of the gantry machine instrument has been taken a vital review that incorporates plan, examination and advancement of the whole gantry structure. Gantry structure is somewhat overwhelming stacking lifting machine starting with one place then onto the next place it advantages to finish work viably and proficiently withoptimized time and decrease in the human work.

At the point when the innovation enhanced with that estimation of time as a part of cost sparing, the structure ought to be advanced by method for updating it by lessening the material thus, streamlining. In gantry structure, shaft assumes a critical part in dynamic and static qualities. As in the present review conduct of the shaft is examined by considering diverse sorts of load. A portion of the exploration paper clarifies about that quality and firmness of gantry machine and clarified about center place of the shaft having most extreme quality in its inner structure.Liand and Lio have dealt with the FEM investigation of crossbeam by shifting rib plates. Later Shi directed modular investigation and got shortcoming in cross shaft to do advance enhancement. The main reverberation recurrence and work space utilizing the improvement in light of utilitarian reliance and geometry. gantry machine which having vast work space for open by contrasted with many machines, so they told that utilizing advancement they got kinematic plan and gives the work space and recurrence more than 50hz They examined on basic examination of gantry CNC machine how much quality that gantry pillar will withstand and got the twisting and stress conveyance of shaft. A few reviews clarified about limited component and modular examination hypothesis for better change of execution and additionally structure of machine with static and element investigation and anticipating ideal outline for enhancement. With reference to writing concentrate exhibit investigate concentrated on the static and modular examination of gantry structure introduced the anxiety levels and relocation. The last outcomes are utilized to upgrade the whole structure which prompt to lessen cost of the entire machine.

Streamlining requires for the most part incorporates shape enhancement, measure improvement and topological advancement. Basic streamlining is abnormal state in topological enhancement; topology data is done here. Wang' in Dalian college he completed the topological improvement on a cross shaft in gantry machine lastly 6% lighter than unique, then Jun Xin Liu and Zhi Dong Li utilized guide-weight strategy to explain topological streamlining by having various burdens. Customary outline supplanted by structure improvement with objective arranged orderly technique, the primary concern is to see the lower the cost with best execution of structure utilizing topology enhancement it's otherwise called basic format. Gantry bar it is a piece of full machine to which static investigation given on the anxiety position utilizing FE examination without changing geometry measure advanced to it so gantry bar solidness and quality expanded, to enhance unwavering

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quality of that bar reinforcing ribs added to it gantry bar quality decreased and improved the gantry. Christo Ananth et al. [2] proposed a system about Efficient Sensor Network for Vehicle Security. Today vehicle theft rate is very high, greater challenges are coming from thieves thus tracking/ alarming systems are being deployed with an increasingly popularity .As per as security is concerned today most of the vehicles are running on the LPG so it is necessary to monitor any leakage or level of LPG in order to provide safety to passenger. Also in this fast running world everybody is in hurry so it is required to provide fully automated maintenance system to make the journey of the passenger safe, comfortable and economical. To make the system more intelligent and advanced it is required to introduce some important developments that can help to promote not only the luxurious but also safety drive to the owner. The system "Efficient Sensor Network for Vehicle Security", introduces a new trend in automobile industry. Christo Ananth et al. [3] discussed about Intelligent Sensor Network for Vehicle Maintenance System. Modern automobiles are no longer mere mechanical devices; they are pervasively monitored through various sensor networks & using integrated circuits and microprocessor based design and control techniques while this transformation has driven major advancements in efficiency and safety. In the existing system the stress was given on the safety of the vehicle, modification in the physical structure of the vehicle but the proposed system introduces essential concept in the field of automobile industry. It is an interfacing of the advanced technologies like Embedded Systems and the Automobile world. This "Intelligent Sensor Network for Vehicle Maintenance System" is best suitable for vehicle security as well as for vehicle's maintenance. Further it also supports advanced feature of GSM module interfacing. Through this concept in case of any emergency or accident the system will automatically sense and records the different parameters like LPG gas level, Engine Temperature, present speed and etc. so that at the time of investigation this parameters may play important role to find out the possible reasons of the accident. Further, in case of accident & in case of stealing of vehicle GSM module will send SMS to the Police, insurance company as well as to the family members.

Christo Ananth et al. [4] discussed about an eye blinking sensor. Nowadays heart attack patients are increasing day by day."Though it is tough to save the heart attack patients, we can increase the statistics of saving the life of patients & the life of others whom they are responsible for. The main design of this project is to track the heart attack of patients who are suffering from any attacks during driving and send them a medical need & thereby to stop the vehicle to ensure that the persons along them are safe from accident. Here, an eye blinking sensor is used to sense the blinking of the eye. spO2 sensor checks the pulse rate of the patient. Both are connected to micro controller.If eye blinking gets stopped then the signal is sent to the controller to make an alarm through the buffer. If spO2 sensor senses a variation in pulse or low oxygen content in blood, it may results in heart failure and therefore the controller stops the motor of the vehicle. Then Tarang F4 transmitter is used to send the vehicle number & the mobile number of the patient to a nearest medical station within 25 km for medical aid. The pulse rate monitored via LCD .The Tarang F4 receiver receives the signal and passes through controller and the number gets displayed in the LCD screen and an alarm is produced through a buzzer as soon the signal is received. Christo Ananth et al. [5] discussed about a system, GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management. The database stores the current month and also all the previous month data for the future use. Hence the system saves a lot amount of time and energy. Due to the power fluctuations, there might be a damage in the home appliances. Hence to avoid such damages and to protect the appliances, the voltage controlling method can be implemented. Christo Ananth et al. [6] discussed about a project, in this project an automatic meter reading system is designed using GSM Technology. The embedded micro controller is interfaced with the GSM Module. This setup is fitted in home. The energy meter is attached to the micro controller. This controller reads the data from the meter output and transfers that data to GSM Module through the serial port. The embedded micro controller has the knowledge of sending message to the system through the GSM module. Another system is placed in EB office, which is the authority office. When they send "unit request" to the microcontroller which is placed in home. Then the unit value is sent to the EB office PC through GSM module. According to the readings, the authority officer will send the information about the bill to the customer. If the customer doesn't pay bill on-time, the power supply to the corresponding home power unit is cut, by sending the command through to the microcontroller. Once the payment of bill is done the power supply is given to the customer. Power management concept is introduced, in which during the restriction mode only limited amount of power supply can be used by the customer. Christo Ananth et al. [7] discussed about Positioning Of a Vehicle in a Combined Indoor-Outdoor Scenario, The development in technology has given us all sophistications but equal amounts of threats too. This has brought us an urge to bring a complete security system that monitors an object continuously. Consider a situation where a cargo vehicle carrying valuable material is moving in an area using GPS (an outdoor sensor) we can monitor it but the actual problem arises when its movement involves both indoor (within the industry) and outdoor because GPS has its limitations in indoor environment. Hence it is essential to have an additional sensor that would enable us a continuous monitoring /tracking without cutoff of the signal. In this paper we bring out a solution by combining Ultra wide band (UWB) with GPS sensory information which eliminates the limitations of conventional tracking methods in mixed

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scenario(indoor and outdoor) The same method finds application in mobile robots, monitoring a person on grounds of security, etc. Christo Ananth et al. [8] discussed about Nanorobots Control Activation For Stenosed Coronary Occlusion, this paper presents the study of nanorobots control activation for stenosed coronary occlusion, with the practical use of chemical and thermal gradients for biomedical problems. The recent developments on nanotechnology new materials allied with electronics device miniaturization may enable nanorobots for the next few years. New possibilities for medicine are expected with the development of nanorobots. It may help to advance the treatment of a wide number of diseases: cardiovascular problems, neurosurgery, cancer, diabetes and new cell therapies. The implementation of new methodologies to help on manufacturing analyses and system design for the development of nanoscale molecular machine is one of the most important fields for research. The use of 3D physically based simulation in conjunction with clinical data may provide ways to design practical approaches for control and transducers development. Christo Ananth et al. [9] proposed a system, this fully automatic vehicle is equipped by micro controller, motor driving mechanism and battery. The power stored in the battery is used to drive the DC motor that causes the movement to AGV. The speed of rotation of DC motor i.e., velocity of AGV is controlled by the microprocessor controller.This is an era of automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased.

II. PROPOSED SYSTEM

Based on the literature study, the present work mainly focused on the following objectives:

- Newly developed Special purpose machine is associated with modern technology.
- Proposed design completes the task very easily and accurately.
- Completely self and sufficiently working within the required time.
- Fastest task completing capability, accessibility for operation and maintenance.

ANALYSIS.

FEM subdivides a large problem into smaller, simpler, parts, called finite elements. The simple equations that model these finite elements are then assembled into a larger system of equations that models the entire problem.

FEM Model

FEM subdivides an expansive issue into littler, less difficult, parts, called limited components. The basic conditions that model these limited components are then gathered into a bigger arrangement of conditions that models the whole issue.

Nastran Procedure To Solve Structural Problem.

1. Geometry- Import the CAD model from hyper mesh
2. FE Modeling
3. Checking the model
4. Analyzing model
5. Post processing
6. Document Results

Fig.1. FE Model of gantry

The prior ventures existing plan are very flexible, here outlined model in light of existing models just yet contrasts in materials properties and quality of the structure differs, in this venture anticipated that would have a decent capacity of lifting the weights with precision and versatility must kept up. The prior plan structures are tremendous with that costs of assembling likewise too high, so in this re outlined model which is enhanced to spare the cost and expected powerful work operation inside required time.

III. RESULTS AND DISCUSSION

Structural Analysis

Hyper work is a FE pre-processor and post processor for the FE solver, plan which is broke down by designer with the high successful performed and visual environment. It is straightforward and learn with bolster direct to utilize the CAD geometry whichprovides great productivity. It permit to advance lattices from a criteria change networks utilizing transforming and make mid surface by the model which shift in thickness. Basic examination which decide the impact of burdens on structure and additionally their segments. The structure mostly subjected to the investigation must withstand stacks for Example Bridge, vehicle, furniture, organic tissue. Auxiliary examination used to demonstrate the wellness of thing tried. Which spares the physical test it is the most imperative part in building to know plan of structure, it for the most part join field of connected math's, material science to process misshapening of structure, powers of inside and stretch, response which support to it soundness. In basic investigation for the most part observe the Structure and Load .Structure which alludes as body used to bolster the heap in common we use to see, in different branches ship and air ship

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outlines, weight vessel, mechanical framework. It is for security reason to do this test and a designer must see the serviceability and wellbeing.
Add up to most extreme anxiety: 8.6mpa

Optimization

Enhancement implies include or expel of material for the savvy and additionally how build needs that by that burdens may differ certainly with that quality and solidness as well. So it relies on upon framework in what capacity ought to work the thing lessen or increment. Constrained optimization problem: which related to one or more constraints. Christo Ananth et al.[10] discussed about E-plane and H-plane patterns which forms the basis of Microwave Engineering principles. Christo Ananth et al.[11] presented a brief outline on Electronic Devices and Circuits which forms the basis of Diodes, Clippers and Clampers. Unconstrained optimization problems: no constraint in this.
Max Displacement: 1.179MM

Modal Analysis

MODES (RESONANCE) are characteristic properties of structure;it is controlled by for the most part the properties those are mass, firmness, damping properties). Characteristic recurrence characterized to mode, modular damping and mode shape. On the off chance that limit state of structure changed than modes additionally change Consider that mass added to a pump vertical it vibrates in light of the fact that mode changed. Normal recurrence of a mode the general working diversion state of the machine will overwhelm by mode state of reverberation. Working avoidance shape implies on structure any constrained movement that to of at least two focuses.

Frequency = 103.3Hz

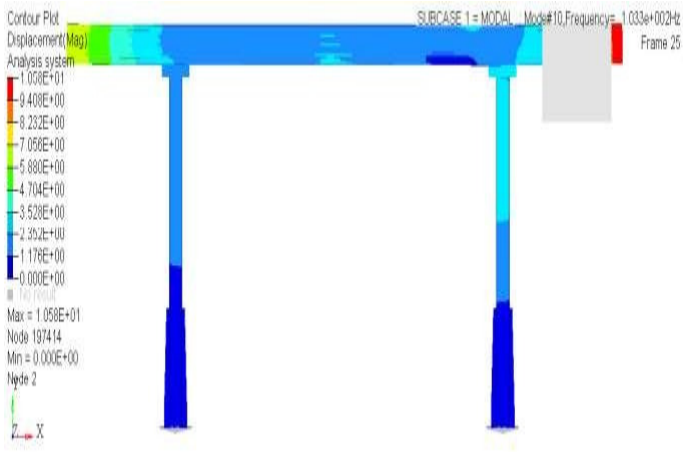

Fig.2. Mode Shapes

IV. CONCLUSION

In the long time past days exceptionally muddled thing is in the business is to convey overwhelming stacked segments and lifting starting with one place then onto the next place, human exertion needs bunches of vitality and it requires more investment for same work, there are numerous enormous and expansive measure of load lifting machine accessible, in that initially began with gantry derrick and gantry cranes with which they convey substantial burdens from one place to other, it works so far when yet it can work just in open place, in little scale enterprises it can't work, amid the period the need is new machine which works in little scale ventures with great time, the changing the era with the new innovation enterprises are wanted to build up the uncommon reason machine which is utilized to lift the overwhelming burdens. Basic examination of the "Gantry Structure" has been completed to locate the mechanical reaction of the structure, subjected to connected burdens and limit conditions. The outcomes incorporate twisted state of the structure, relocations at required areas. Modular examination accomplished for checking the model, Gravity Loading Applied for various position and checked for the twisting of Solid Beam for various position. Enhancement is done to decrease the cost of the structure. The reaction of the structure got by basic investigation utilizing MSC Nastran.

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