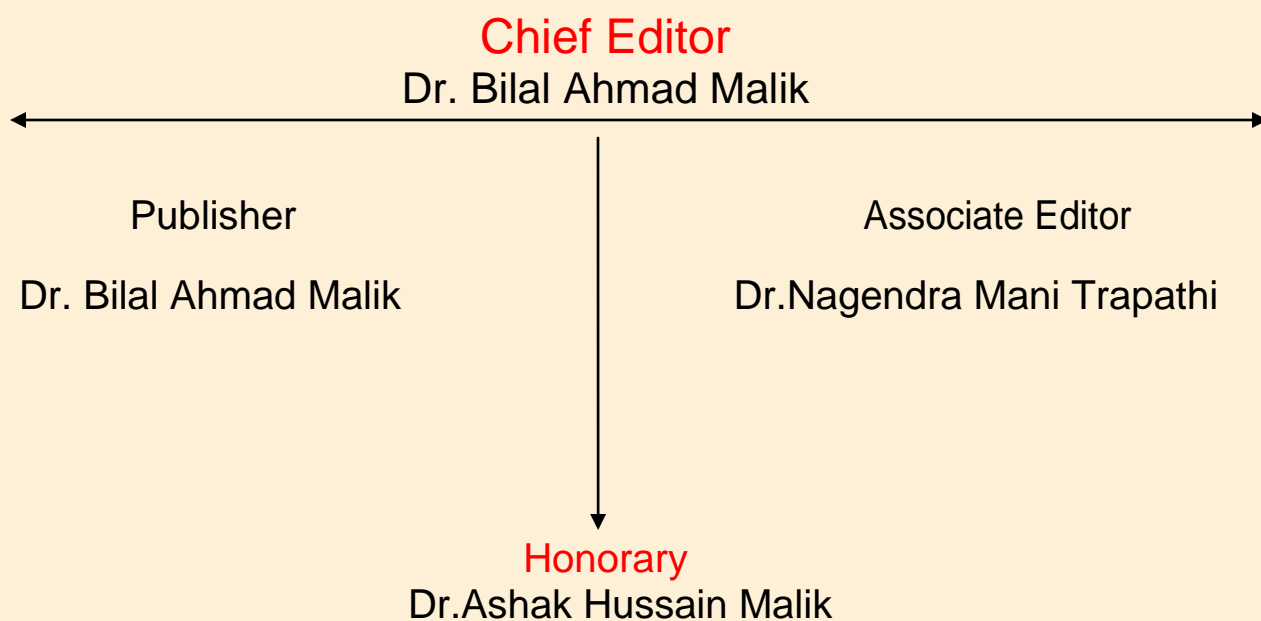


North Asian International Research Journal Consortium

*North Asian International Research Journal
Of
Science, Engineering and Information Technology*



NAIRJC JOURNAL PUBLICATION

North Asian
International
Research Journal Consortium



Welcome to NAIRJC

ISSN NO: 2454 -7514

North Asian International Research Journal of Science, Engineering & Information Technology is a research journal, published monthly in English, Hindi, Urdu all research papers submitted to the journal will be double-blind peer reviewed referred by members of the editorial board. Readers will include investigator in Universities, Research Institutes Government and Industry with research interest in the general subjects

Editorial Board

M.C.P. Singh Head Information Technology Dr C.V. Rama University	S.P. Singh Department of Botany B.H.U. Varanasi.	A. K. M. Abdul Hakim Dept. of Materials and Metallurgical Engineering, BUET, Dhaka
Abdullah Khan Department of Chemical Engineering & Technology University of the Punjab	Vinay Kumar Department of Physics Shri Mata Vaishno Devi University Jammu	Rajpal Choudhary Dept. Govt. Engg. College Bikaner Rajasthan
Zia ur Rehman Department of Pharmacy PCTE Institute of Pharmacy Ludhiana, Punjab	Rani Devi Department of Physics University of Jammu	Moinuddin Khan Dept. of Botany Singhaniya University Rajasthan.
Manish Mishra Dept. of Engg, United College Ald.UPTU Lucknow	Ishfaq Hussain Dept. of Computer Science IUST, Kashmir	Ravi Kumar Pandey Director, H.I.M.T, Allahabad
Tihar Pandit Dept. of Environmental Science, University of Kashmir.	Abd El-Aleem Saad Soliman Desoky Dept of Plant Protection, Faculty of Agriculture, Sohag University, Egypt	M.N. Singh Director School of Science UPRTOU Allahabad
Mushtaq Ahmad Dept.of Mathematics Central University of Kashmir	Nisar Hussain Dept. of Medicine A.I. Medical College (U.P) Kanpur University	M.Abdur Razzak Dept. of Electrical & Electronic Engg. I.U Bangladesh

Address: - Dr. Ashak Hussain Malik House No. 221 Gangoo, Pulwama, Jammu and Kashmir, India - 192301, Cell: 09086405302, 09906662570, Ph. No: 01933-212815,

Email: nairjc5@gmail.com, nairjc@nairjc.com, info@nairjc.com Website: www.nairjc.com

SOLAR ENERGY OPERATED CRANE

ANIKET TAPKIR¹, LAXMAN THORAT², YOGESH SONAWANE³ & PROF. A.DESHPANDE⁴

Department of Mechanical Engineering, P.K.Technical campus, chakan. 410501

1. INTRODUCTION

Today there is a need to develop renewable or nonconventional energy sources because of fast depletion of the fossil fuels like wood, crude oil, coal, natural gases etc. The wood is a most consumable type of fuel in India hence, reducing the jungles and trees causing deforestation. Due to tremendous use of fossil fuels pollution is increased and rain fall also reduced. Other fossil fuels are not fulfilling the need of energy in India and the use is very vast in India due to the huge population. The prices of fossil fuels are on hike around the world. Almost 35% price of total economy of India is spent on fuels. Hence there is a need to develop non conventional energy sources like wind, water and solar energy. Among all available renewable energy sources solar energy is available in abundance all over the world and can be easily converted in to electrical energy.

The proposed work represents design of lifting crane which is operated on solar energy. The main aim of this project is to design and fabricate a model of material handling equipment i.e. lifting crane with introducing the use of solar energy to run equipment. It is a model of material handling equipment basically used to lift and lower the load.

A crane is a type of machine, generally equipped with a hoist, wire ropes or chains, and boom that can be used both to lift and lower materials. It is mainly used for lifting heavy things and transporting them to other places. It uses one or more simple machines to create mechanical advantage and thus move loads beyond the normal capability of a man.

Some external source of energy is needed to power the machine. Similarly crane also works on diesel generator engine, electric motor etc. The remaining all parts remains mechanical including structure, body frame, gear box & all other accessories. But in this work by making a new development instead of using diesel generator or other power generating means; solar panels & 12v battery is used to power the crane.

Since the total investment for the actual equipment is more, The model of equipment is designed and fabricated by considering the total mechanical design considerations. The work is done to design the crane to lift the weight up to 45kg.

2. LITERATURE REVIEW

TOPIC NAME: Improvement in the Design of Engine Crane for Modern Industries

AUTHOR: Adzimah, Stephen Kwasi, Akinwonmi, Ademola Samuel, Bentum-Mensah.

ABSTRACT:

This paper presents an improvement in the design of engine crane, introducing a rotating mechanism comprising a gearing system, electric motor, and solid shaft with flange, sleeve bearing, and a support bearing. The precision cut gears used are made of steel with endurance strength of 55 MN/m² (according to the American Gear Manufacturers Association (AGMA)). In the design, the limiting endurance load of 17.06 KN and the limiting wear load of 22.96 KN are greater than dynamic load of 10.83 KN which implies the design is satisfactory from the standpoint of wear, dynamic and endurance loads. Since the use of cranes is indispensable in the industry, the design will aid productivity, safety of workers, ergonomics, efficiency, effectiveness and versatility of the cranes, for which they are designed and manufactured.

CONCLUSION:

The redesign of the engine crane will replace the manual means of lifting car engine from one point to the other in a modern workshop. The construction is costly because of the introduction of other components into the existing design, but it will eliminate the risk in lifting the engines with the hands.

TOPIC NAME: Heavy Lift Crane Selection***AUTHOR: R.L. Mikut, Jr., P.E.*****ABSTRACT:**

Many factors must be looked at simultaneously to properly select a heavy lift crane for a specific job. There are various types of cranes including crawler, tower, ringer, derricks and more. The type of crane, the size of the load, site constraints, and deductions from the listed crane capacity, ground-bearing pressures, crane efficiency and rental costs must all be taken into account. This paper will discuss how to take all of these issues and constraints into account when selecting the proper heavy lift crane. Knowing the weight and dimensions of the component to be lifted is a critical element, but there are many other items that should be considered. Site constraints may actually impact the selection of the crane more than the lifted element itself. Also, when sizing the crane, the weight of the rigging, the crane block, line weight and other items below the boom point must be added to the load weight. Another major factor affecting crane selection is the ground-bearing pressure imposed by the crane and the ground preparation needed. Costs must be considered. Taking these and other factors into account, a properly sized heavy lift crane is an important component to completing a job safely and effectively.

CONCLUSION:

Heavy lift crane selection is a complex process. There are a variety of issues that must be taken into account simultaneously to select the best crane for the job. The existing site constraints may have more influence on crane selection than the actual loads to be picked. When considering the loads, all deductions must be used to determine the correct crane capacity. The ground-bearing pressure must also be analyzed to ensure that the existing soil conditions can

Handle the imposed loads. The construction industry would greatly benefit by more investment in research on calculating Babcock & Wilcox Power Generation Group ground-bearing pressures and the formation of a standard calculation. After the crane has been selected, the rental rates should be analyzed based on multiple factors and not just the lowest cost. It is expected that more advanced algorithms and crane selection programs will continue to be developed to incorporate additional variables to assist in the heavy lift crane selection process.

LIST OF COMPONENTS

1. Frame
2. Solar plates
3. Battery
4. DC Motor
5. Chain Drive
6. Gear Box
7. Bearings
8. Nut and Bolts
9. Hook
10. Rope
11. Shaft
12. Pulley

METHODOLOGY AND WORKING

With the help of solar panel solar energy is converted into electrical energy and stored in battery used to drive the motor for lifting the load

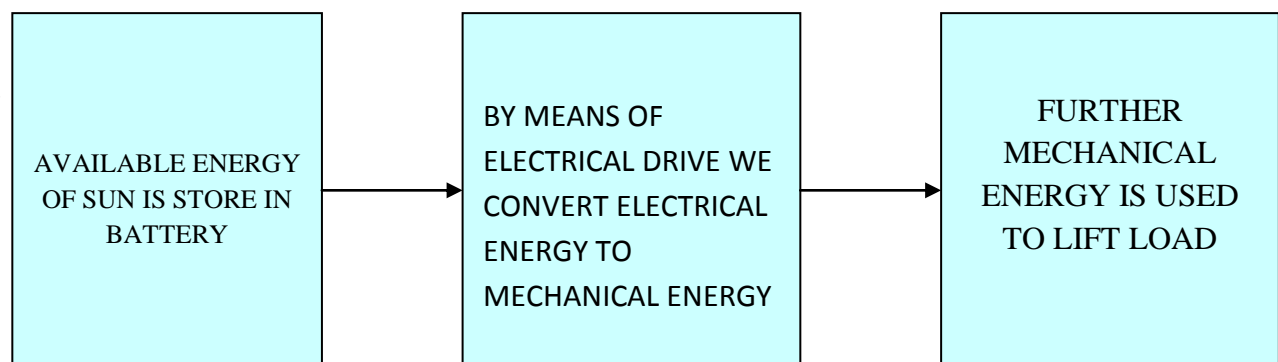


Fig: Set-up flow diagram.

- Sun rays are incident on solar panel .
- Solar panel convert solar energy into electrical energy.
- This electrical energy is conveyed to battery via electrical wires.
- The function of battery is to stored this electrical energy .
- Battery provides electrical power to drive the DC motor.
- Output of dc motor shaft is connected to small chain sprocket.
- This small chain sprocket is connected to to big chain sprocket by using chain.
- Power is transmitted from motor shaft to intermediate shaft by using chain drive.
- Pinion is attached on the same shaft of bigger sprocket shaft.
- Pinion is meshed with gear and the drum is mounted on the same shaft of a gear.
- Speed reduction is achieved by gear drive and sufficient torque is obtained to lift the load.
- One end of rope is attached to drum and at the another end of rope the load is attached which is to be lifted by using hook.
- When switch is ON power is supplied to the DC motor.
- Power is transmitted through motor to chain drive.
- By using chain drive power is transmitted to intermediate shaft.
- On the intermediate shaft there is pinion mounted.
- Power is transmitted from intermediate shaft to output shaft through gear drive.
- On the output shaft dru is mounted.
- As drum rotates wire get wounded over the drum and weight is lifted .
- To lower the load connection are reversed by using two way switch.

ADVANTAGES

- * Utilization of non conventional energy source to overcome energy crisis.
- * Saving in convention energy source.
- * Real design prototype of big material handling equipment.
- * Non pollutant.
- * Noiseless.
- * Safety in handling.
- * Can be utilizing where electrical power source is not available.

- * Utilization of solar energy with mechanical advantage is giving us more Output in less input.

DISADVANTAGES

- * Required higher cost as solar panel technology is not so invented by our country.
- * The solar energy is depends upon season in our country.

Publish Research Article

Dear Sir/Mam,

We invite unpublished Research Paper, Summary of Research Project, Theses, Books and Book Review for publication.

**Address:- Dr. Ashak Hussain Malik House No-221, Gangoo Pulwama - 192301
Jammu & Kashmir, India**

Cell: 09086405302, 09906662570,

Ph No: 01933212815

Email:- nairjc5@gmail.com, nairjc@nairjc.com , info@nairjc.com

Website: www.nairjc.com

