

BENEFITS OF INNOVATION IN CONSTRUCTION EQUIPMENT

Analysis of the benefits of Modern Construction Equipment

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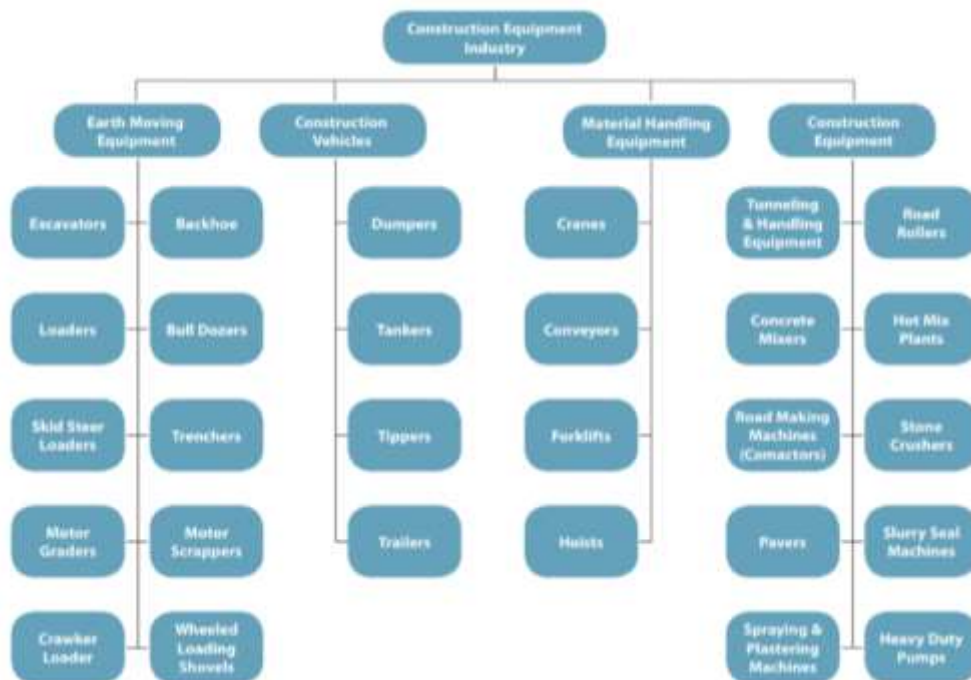
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Abstract: The contribution of the Indian construction sector to the GDP is approximately 10%. Massive growth occurs in the construction sectors due to the boom in IT sectors and other fast-growing services in the country. However, with the rapid increase in infrastructure demand, several new challenges have emerged in various forms, like a massive number of projects, strict time stipulations, quality and safety assurance, unexpected rise/jump in materials prices essentially required for the construction project development. In addition, outdated methods and old equipment used in India are creating obstacles to that growth. This paper focuses on identifying the factors influencing modern equipment and then discusses how productivity and safety at the workplace can be increased based on results from old researchers and available data.

Index Terms – Construction, Technology, Modern, Innovation.

INTRODUCTION

Business investments and enterprises globally are rising parallel to the technology and its application for internal and external project conduct. The new normal has pushed many construction corporations and contractors to foster and accustom technological solutions in the short-term and post-pandemic. This unprecedented experience has generated a quickening of construction technology adoption as a need of doing trade today. Construction equipment has evolved as per changing requirements in the industry. Earlier, many kits were required for one job, but now one piece of equipment can do multiple jobs. Appropriate use of equipment contributes to project completion on time, work speed, quality, and, most important, economy. However, the scenario has not always been possible for the contractor undergoing construction works to own every type of construction equipment required due to the project's complexity.



Furthermore, shortage of skilled or efficient workforce, the project involving handling many earth materials, coping with the management of time, and time executing them, etc. However, one can certainly purchase or hire the equipment as per the site conditions and requirements. If the equipment must be used often and for a longer duration, the contractor might also think it is economical to buy the equipment. On the contrary, if the equipment must be used occasionally and for a short duration, it is economical to get it hired from a local equipment contractor.

FEW EXAMPLES OF MODERN CONSTRUCTION EQUIPMENT ON THE MARKET

THE HYDRAULIC BLOCK MAKING MACHINE (QTY4-15)

QTY4-15 brick machine is a new kind of fully automatic product developed by Autoway Machinery, and the equipment structure is simple and practical. The outlook is novel and attractive. In addition, to produce porous brick, it is particularly suited to the production of standard bricks; mould replacement can make many cements paving brick, hollow brick, curb stone bricks, etc.

The electronic system uses the PLC program-control and screen display of Siemens, and it can be operated either in automatic state, semi-automatic, and manually. Moreover, it can work automatically countless times. The entire control system is also equipped with data input and output devices, safety work control devices and features such as failure diagnosis devices, and a remote monitoring.



The machine produces blocks and bricks of stable and high quality with a low rate of waste products. The device employs electronic, hydraulic, and mechanical integrated technology, and each program can lock each other. Thus, the whole process is connected smoothly. The machine is versatile. Hence, it can produce various types of porous blocks, standard bricks, hollow blocks, paving blocks, curb stone grassland bricks, and so on by changing the individual moulds.

Road cement concrete slip form pavers machine (ZMST3400)

The technology of the ZMST3400 slip form is imported from the American Company Pro-Hoff. Using this paver can significantly improve paving quality and speed. Therefore, it is widely used to meet the need for concrete pavement construction in various countries.

The hydraulic circuits drive all the components, and the machine travels with two crawlers. Moreover, the automatic driving and leveling administration functions are built into this machine. When in action, the paver machine can accomplish scraping, paving, shaking, vibrating, extruding, and shaping at one time. Meanwhile, the device can pave the road edge with the edge mold, and the appliance can also insert the reinforced steel bars in the road from either middle or side of the road.

The powerful Volvo TAD721VE water-cooled engine, with high-torque reservation, low fuel consumption, and emission, conforms to European environmental standards. They are also fitted with an original German water cooling engine with reliable and robust power. The Control System Micro-computer system with self-diagnostic capability. Hydraulic synchromesh for vibration bar contains the step-less frequency conversion to supply optimum frequency for all kinds of concrete works.

The entire hydraulic driving system integrates mechanical, electrical, and hydraulic energy centrally controlled by multi-controllers. Furthermore, graphical annotations display the conditions, with the function of integration failure diagnosis show, alarm, etc.



As a result, the total performance is sharply improved. The console is a user-friendly interface with display, real-time monitoring for machine status. The worker can control the scrapper and the material distributing device from the L/R side independently. The crawler traveling devices are composed of a lifetime lubricated supporting wheel, and crawler plates are durable with good adhesion, not easy to skid.

Use of Modern Equipment to Save Time and how they will affect the future construction workforce.

One of the benefits of using modern construction equipment is that one can save time; thus, it reduces the risk of project delay, decreases the unpredictability nature of project budget rise/jump, and few other benefits. Modern equipment has proved to reduce time, the number of required labors over time in the fields of excavation, lifting heavy weights, transferring materials from one place to another, batching, mixing of materials, soil compaction, etc. The use of automated specialist systems for construction applications is a growing trend. Current examples include practices to diagnose vibration problems in rotating machinery and verify the weld performance qualifications. Expert systems will probably be the most critical application of artificial intelligence techniques for construction over the next decade. By the turn of the century, there is good potential for increased use of self-directed robots controlled by expert systems.

In construction, the building is static, and the robot would have the ability to move about in the performance of its tasks. The workers can use technologies such as laser range-finding and geodetic positioning to pinpoint exact locations, automate the storage areas on the job site, and set guide tracks for vehicles to be operated remotely. The practitioners will gradually integrate these technologies into a coherent functional system for the possibility of a highly automated control option for certain job site activities. The advancement of robotics usually observes the boom of Automation in the construction domain, and the development and application of robotic in all industry sectors are relatively new.

Technology is reshaping the nature and shape of the markets served by the construction sector, just as it is changing particular activities in the construction process. One of the most obvious of these changes is new markets because of technological progress in general. Technology is also advancing to revolutionize the way we design and revise building principles. In the era before robotics and Automation, code-setting required attention to many safety factors based on the uncertainties in many design computations. Despite the traditional constraints that retard the changing of codes and principles, it is likely that multiple automated construction technologies will reduce physical quantity requirements and costs considerably simply by lowering the overprotective limits in some of today's codes.

Conclusion and prediction

At present, the construction project management involves activities ranging from planning, scheduling, and execution that are to be managed coherently by the project administrator. Hence, making the role of the administrator a very crucial and challenging one. Coordination of the administrator with different departments is still the challenge faced by the industry. Also, with the growing interdependence on digitalization, demand for integrating traditional processes with innovative construction IT solutions have gained traction.

In the next 10 years, the greatest technical impact in the construction sector is expected to come from improved management methods and automation. Advancements in management methods to improve productivity and schedule performance will employ automation and expert systems to a great degree. Construction design will see increased sophistication in the conceptual phase and real-time data base communications networks to support estimating, scheduling, and project management. The use of creative software solutions will help assist the project manager to efficiently coordinate with other team members and maintain the construction pace. Moreover, the increase in data-driven decision making, the estimation, and optimization of resources will also be made simpler and efficient.

I can foresee the demand for having a complete digital solution for project management is high while the supply side is scarce. In the coming half a decade the project managers will be able to monitor the project activities at a touch of their fingertips with help of upcoming technological transformation.

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