

MECHANISATION IN ROAD SECTOR

Mechanization is the process of changing from working largely or exclusively by hand to doing that work with machinery. The mechanization has several advantages. The work can be done speedily due to large output of machines, deployment of machinery is cost effective, can be deployed in difficult areas, the work can be done in time, large quantity of materials can be handled and effective quality control can be exercised so the size of the project can be increased. Optimum use of material, man power and finance can be achieved by deploying appropriate machinery.

Earlier smooth three-wheel roller 8-10 tonnes were used for compaction of earthwork, sub-base and base courses. In the year 1994 vibratory rollers were introduced in specifications. Drum type hot mix plant was used in bituminous works for preparation of mix for bituminous macadam, semi dense bituminous concrete and bituminous concrete. In the nineties Slip form paver and Batch type hot mix plant were provided in the specifications. Now a days full width pavers up to 11m width are being used in bituminous paving.

The Highway Sector in India is poised for rapid growth, due to launching of project Bharatmala by NHAI, PMGSY by Ministry of Rural Development and projects by other agencies such as NHIDCL and various state Govts. Most of the projects have become time-bound and have to be completed within the stipulated period. Due to this, expectation from the equipment market has also changed. The current trends in the market are going towards more mechanization and higher capacity machines. The speed of execution is the essence and the quality expectations of the end customer are constantly increasing. The customers want from their suppliers not only a machine but also support on the job site, to take care of the fleet of machinery. Machine operator interface will become a must. The electronic adaptation in machinery is improving their usefulness.

Generally road and bridge projects comprise of various activities of diverse nature. Execution of each activity should be planned meticulously to ensure sequential execution in time. There is no alternative to adopting mechanized construction methods to achieve more in less time. Once a decision of deployment of construction equipment is taken, requirement of construction equipment in a project needs to be identified. Selecting an appropriate equipment for a job ideally forms part of the construction planning process and should be chosen for performing any particular task only after analysis of many interrelated factors. The important points for consideration are: function to be performed, capacity of the equipment, method of operation, limitations of the method, costs of the method, cost comparison with other methods, possible modification in earlier acquired machine etc. The capacity of machine to be deployed on any activity is related to the size of activity and overall cost of the project. In the revision of Ministry's Data Book for analysis of rates, this aspect of machinery selection is being considered.

The cost of construction is a major factor in all projects. There are many factors influencing the construction cost such as labour, material, construction equipment and profit etc. Costs of construction equipment ranges from 25% to 40% of total project cost.

Deployment of machinery allows manual efforts to be more productive. Large output can be maintained even if there is a shortage of skilled and semi-skilled manpower (as operators of construction equipment are of different category). Sophisticated road/bridge design may require

precision in implementation which can be achieved by using modern construction equipment equipped with software controls.

Construction equipment and machineries could be rented as and when required for a calculated period of time. Hiring agencies are responsible for their repair, replacement, and even operation depending on the contractual period. On completion of the hiring period, the executing agency would be liability free of the rented items.

Information about machinery can be obtained from the internet or market survey even then a reference hand book with working output of machine and specifications of machinery is required for making assessment of the requirement of machinery for road project. To support the construction industry and the highway departments, need for such a reference document for machinery was being felt for quite same time.

“Pocket book on Road Construction Equipment”, comprising salient features of various equipments, their output, other supporting machinery in relation to various activities in road, bridges and tunnels has been recently published by the IRC. Machinery required for complete execution of any activity of a project and description of usage/working of machinery gives useful information to field engineers. For placing order for any equipment, specifications for the same are required. In the document, specifications for various equipment's have been given. Machinery description have been given for latest machinery such as Track mounted crushing station, Sand preparation plant, Sand classifier, Bucket wheel Sand washer and Road sweepers, etc.

Description of essential equipment for all bridge construction activities such as concrete placement, concrete pumps, pneumatic sinking, bored/driven pile, prestressing, shotcreting, drilling, etc has been explained.

Tunnels are becoming part of hill and urban road projects. Essential equipment required for various tunneling activities such as Excavation, Steel lining, Concrete lining, Shotcreting/Guniting, Grouting and Lifting application have been given. Different tunneling methods including difficulties involved in each method and limitation of the methods, machinery involved in each method and tunnel ventilation system have also been given in the pocket book. The pocket book also includes various equipment required for quality control tests as well as for restoration work in disaster management.

The construction activities in the country are set to take a faster pace in the coming days with the present government drawing its road map of long-term infrastructure development. This has opened up new growth avenues for the construction equipment market in the country. Construction equipment manufacturers are exploring new technologies that provide productivity and fuel efficiency to the machines. They need to adopt clean energy sources and methods to stay in the market.

Reader are requested to make use of the recently released Pocket Book for Road Construction Equipment by IRC and send their valuable feedback for its further improvement.



(Sanjay Kumar Nirmal)

Secretary General

A SMALL INITIATIVE TO SAVE NATURE

Recently we celebrated our 73rd Independence Day. During the past 72 years, we have developed road infrastructure a great deal, however a lot is yet to be done. Although road infrastructure has come up to some age, we are still far behind to discharge our duty towards society to save environment. Towards achieving this responsibility we may take up number of initiatives. Recently Hon'ble Prime Minister during his speech on Independence Day has categorically advised to ban single use plastic. In the first instance, we may take it as a campaign to act towards achieving this goal. What is more important is that we can contribute to a great deal towards use of waste plastic in the road construction. As an initiative, certain locations on Highways may be identified near Urban area for collection of waste plastic and create facility for its segregation and shredding for use in the construction of bituminous pavements layers. At present, the Contractors find it difficult to get the requisite quantity of plastic waste in segregated manner for use in bituminous pavement. Our concerted efforts towards making its assured availability can very well find its greater use in the bituminous pavement and serve the nation towards getting rid of waste plastic which is otherwise endangering the environment. We have also taken initiative to popularise use of re-cycled material in the road construction. This needs to be taken up as a campaign to save pressure on mining of minor minerals and save degradation of environment. There is a need to use locally available material for construction of Highways. There is a greater need to popularise use of soil stabilisation, geo-textile, geo-polymer, turfing through local grass on embankment slopes etc. Another area which also needs equal attention is the depleting ground water level for which policies and the process of water harvesting on highway has to be ensured and taken up as a campaign. The efforts of all stake holders, the highway engineers towards achieving these long cherished aim and target would be greatly appreciated by the Society.



(I.K. Pandey)