

## **MECHANIZATION IN ROADS SECTOR**

Construction of infrastructure contributes a lot to the economic activities and the growth of a nation. Over the years, in many countries around the globe, due to economic, environmental reasons and rising labour costs, more refined working and construction methods have been developed and a wide range of diversified road construction equipment is now available, allowing mechanization of all major activities in road construction. Besides, better quality of construction and better product is achieved by mechanistic construction.

Mechanization in construction became necessary at the turn of the century to achieve better quality and also to substitute labour which was becoming ever more expensive and difficult to recruit. However, in many third world countries labour is still abundant and prepared to work for tragically low wages. In such circumstances, it is not surprising that efforts began some twenty five years ago to develop labour intensive construction techniques more appropriate to the economic situation in developing countries. Such techniques are considered good for low intensity roads like rural roads, providing the last mile connectivity. The International Labour Organization and more recently the World Bank have been the driving force behind this. The former have developed techniques and procedures for planning, managing, and executing public works which promote the use of unskilled labour using simple hand tools and light machinery without significantly sacrificing construction quality. The latter concentrated on the integration of these techniques within an institutional framework

to ensure their sustainability. It has been now realized that the sustainability of labour-based methods depends totally on an institutional framework at the national level. Such techniques also generate employment opportunities for the local population.

The transition from manual methods to more economically effective methods, using a wide range of prefabricated units, gave an impetus to the development of more efficient machines for the assembly of such units as well as machinery and equipment, especially for concrete works. Particularly rapid advances in construction mechanization were made after World War II in response to the urgent need to increase construction production capacity to provide the population with housing, transport and improved standards of living. This was done by developing the construction machine building industry and new technologies.

Through mechanization following goals can be achieved:

- Speed up the execution of works in comparison with manual methods and so shorten the construction period.
- Reduce labour consumption, increase production capacity and reduce work costs.
- Make work in construction zones less arduous and so more attractive.
- Improve work safety as construction is one of the most hazardous fields of human activity.

The effects of globalization and increasing competitive environment in the manufacturing sector, worldwide, have also had a positive impact on construction equipment manufacturing industry in India. Some of the leading international manufacturers have set up manufacturing units in India on their own or as collaborators. The results are quite encouraging. World class batching plants, transit mixers, tower cranes, compactors, rollers, dumpers, tippers, trailers, paver finishers, concrete equipment, mixers, hot plant mixers, stone crushers etc. are being produced in the country. The quality of these equipment as well as after-sales service has also improved. At present, Indian Companies are manufacturing entire range of quality machines/equipment to meet the quality standards and capacity requirements.

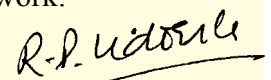
Labour-based techniques do not imply the complete elimination of machinery but rather selective replacement of machine with men. Certain tasks, for example, compaction of the road surface material are better done by mechanical compactors while transport over long distances is better handled by trailers or by trucks, depending on distance. Both of the latter have the advantage of being multi-use which is essential in third world countries where specialised equipment tends to be under utilized. For other tasks, simple machines have been developed which can be used to save labour if wages or scarcity justify it. Depending on local circumstances, such as workers' salaries, availability of manpower and skilled machine operators, equipment, fuel costs, soil and terrain conditions as well as the size of operation, different levels of mechanization can be used in construction of new roads, highways, bridges, subways, etc., ranging from labour-intensive methods with only basic machinery, up to fully mechanized techniques employing a whole fleet of specialized machines.

Unfortunately, labour-based works have not had the success they merit. Changing a well-established methodology requires a multi-level

approach as well as the time to learn. It cannot be done piecemeal and hurriedly. Putting aside the profound shifts in attitude which must be induced, they require extensive training of public works managers and engineers and given the trend towards private sector involvement, technical and financial assistance to construction firms. These in turn can only survive if they can be guaranteed a steady flow of similar work, which can only be assured by a holistic approach.

The real cost of using heavy equipment was greatly under estimated in the past, failing notably to take account of low utilisation rates (about 20% of that obtained in developed countries), lower again for small and remote rural road improvements. Comparisons were clouded by the fact that many countries have acquired large equipment through grants, which although regarded, reasonably enough, as free in the short term, are ageing rapidly and must eventually be replaced. In the meantime, they become extremely expensive to run. Finally, the environmental destruction caused by heavy machinery must not be forgotten.

Mechanized construction in road sector will help in cutting down the period of construction as well as improving the quality of construction to a great extent. However, the machines, with whatever sophistication, will not give effective and satisfactory service unless man behind it is trained and is capable of handling them properly. To achieve the objective, it is essential that the manpower involved in day-to-day operation, repairs and maintenance of the machines is trained to keep them abreast with the latest technology. In view of the fast technological advancement in the construction equipment, the staff at the supervisory level is also required to be given training at regular intervals to update their skills, which would help in improving productivity and efficiency in the area of their work.



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