

Status of Forest Ergonomics in Indian Forestry

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Short Communication

Ergonomics is the systematic study of people at work with the objective of improving the work situation, the working conditions and the tasks performed. As technology advanced, greater flexibility allowed necessary adaptation because human performance was limiting the performance of the system. Thus, ergonomics becomes simultaneously more necessary and more feasible with the advancement in technology. The aim of ergonomics is to ensure that the working situation is in harmony with the activities of the worker. This aim is self-evidently valid, but attaining it, is far from easy for a variety of reasons. The human operator is flexible and adaptable and there is continuous learning, but there are quite large individual differences. Some differences, such as physical size and strength, are obvious, but others, such as cultural differences and differences in style and in level of skill, are less easy to identify.

In view of these complexities, it might seem that the solution is to provide a flexible situation where, the human operator can optimize a specifically appropriate way of doing things. Unfortunately such an approach is sometimes impracticable because the more efficient way is often not obvious, with the result that a worker can go on doing something the wrong way or in the wrong conditions for years. Thus, it is necessary to adopt a systematic approach: To start from a sound theory, to set measurable objectives and to check success against these objectives viz. safety and health, productivity and efficiency, reliability and quality, job satisfaction and personal development [1].

The principle types of forest vegetation in India are: Moist tropical forests, dry tropical forests, montane sub-tropical forests, montane temperate forests and alpine forests. The management of these forests under one umbrella is a tedious task because of diverse types of forests, which involves lot of ergonomic efforts for enhancement of the productivity. The status of forest ergonomics with respect to Indian perspective is that only few people are aware of it. However, forestry students in India are at least studying this course in their undergraduate programme which is making them conscious about the benefits of this approach. Earlier, this name was confused with the agronomy and economics by many people. Even today, some of the forestry professionals who do not have knowledge of ergonomic principles get confused to explain the details. So far as practical aspect is concerned, the applicability of this subject is still a dream to come true. If the overall situation is to be considered, this subject is growing up and the new forestry professionals who are joining the services in forestry sector are trying to follow the ergonomic guidelines to manage the forestry based tasks in a scientific way. Generally, the various forestry jobs are related to nursery management, plantation, tending operations, felling, conversion, storage, treatment, final disposal, etc. The chances and scope of improvements with respect to observance of ergonomic principles are there and the suggestions for few important forestry operations and requirements thereof are explained below.

Nursery and Forest Management

The management of nursery as well as forest generally involves light work and small risks. However, a lot of heavy and difficult tasks are also involved which are needed to be done with careful planning, instructions and close supervision. In India, planting of trees is becoming an important activity of forest management. Very often in our country, the planting activities are carried out on land having difficult terrain and poor accessibility by the unskilled workers. Thus, the incentives and benefits of improving tree planting operations are not always perceived.

The forest nurseries in India are located in the forests itself and as a rule these should be well connected. Barring few, most of these are not easily reachable and even lack the basic amenities on the name of mechanization. Even the source of seed is not identifiable and the quality of planting material raised cannot be ascertained. The seed is collected from small sized trees as there are no facilities to harvest the seeds from superior trees of larger size with straight and clean bole. This is leading to the loss of genetic gain. More than 70-80% of the total forests in India are managed under the systems mainly dependent on natural regeneration. The tending operations are also not carried out because of lack of tools and facilities. This is resulting into the reduction of forest productivity. Hence, scientific management based on sound ergonomic principles is the urgent need of the day to enhance the productivity of Indian forests.

Forest Workers

Living conditions of forest workers both at home and at the workplace contribute to their health and comfort as poor living conditions increases the chances of accidents, diseases, loss in working efficiency, poor income and low socio-economic conditions. As per the report of Bostrand [2] the working and living conditions of forest workers are generally poor in most of the countries all over the world; very often, work efficiency is also poor. Physically heavy work, inadequate working methods, working techniques and tools and equipment cause not only occupational accidents, diseases and unnecessary fatigue, but low productivity as well. In countries with available accident records, forestry appears to be one of the most hazardous occupations, with frequent and severe accidents and many diseases.

In India, the first and foremost requirement in carrying out the various forest jobs are workers who are exposed to all the odds of wild flora and fauna in addition to the tough terrain and varied weather conditions. Almost every forest worker should be trained to face these adversaries before their exposure to forestry work. We are lacking ergonomic training to counter these. The use of ergonomically designed tools is very rare. Generally the forest workers get wounded with improper and badly maintained tools.

Use of improved tools and the adoption of correct logging techniques are essential for effecting improvements in the harvesting system. But tools are used and maintained by the workers themselves and thus the success or failure of the programme depends upon training and performance of the workers. It is therefore, necessary to study the situation of the workers and to have a full perception of their background, wages, productivity, incentives, period of employment and living conditions, etc. A package of services can be a motivating factor for the workers to produce and earn more and raise their standard of living. As low productivity and avoidable wastage of huge quantities of timber has become a source of increasing concern because of varied importance for principal and accessory tree species. Low quality timbers do not find any use in timber industry and are fully wasted. The diminution of scarce timber resources, largely as a result of widespread deforestation, has added urgency to the problem of attaining optimum efficiency in harvesting. Thus, the use of improved tools and the adoption of better felling techniques would lead to an increase in productivity and a reduction in wastage.

The forests in India are almost entirely owned by the Government, the logging operations are done through the agency of forest contractors who are responsible for arranging their own labour force that works on either Piece-Work System (PWS) or Daily Wage System (DWS) and are provided with minimum wages which lead to over exploitation of the men at work [3]. The results of ergonomic check lists prepared by B.Sc. students during their practical exercise, on different forestry tasks, also reflects the poor status of ergonomic efforts. Therefore, the implementation of these regulations governing payments and also to follow ergonomic principles is much to be desired.

Personal Protective Equipment (PPE)

The main problem associated with the use of Personal Protective Equipment (PPE) at the workplace is its frequent lack of acceptance because this equipment causes various kinds of problems including dynamic spine loads during fall arresting, a reduction of the visual field and perception of visual signals while using spectacles, goggles, and full-face masks, sweat evaporation and heat abstraction, movement restriction and dexterity [4]. Acceptance of all the protectors by their users mainly depends on the weight, shape and size of the protectors, elasticity of fabrics, flexibility and comfort experienced by the users. Therefore, it is so important to consider not only properties determining optimal protection level against selected factors, but also ergonomic aspects ensuring comfort when this equipment is used [5]. In most of the cases in India, traditional tools like axe and saws are still used for felling. These are not ergonomically designed for the work and cause many accidents and injuries. No PPE is used even in the case of power chain saw, which is a new introduction to present day felling equipment. This is causing much fatal accidents.

Nutrition

Nutrition is mainly concerned with the food we eat and its utilization by our body so as to provide energy to be able to work. The reduction in the amount of nutrients in the food consumed by our body contributes to lower resistance to disease and leads to higher rates of accidents and absenteeism which ultimately lower work efficiency and output. The amount of energy required by a worker to be able to carry out a particular work also plays an important role. Therefore, it is necessary to adjust the biological necessity for survival with the amount of energy required to do the job so as to maintain the

balance over a period of time. The food, energy and the nutritive value of food altogether affects the worker's health and capacity to carry out physical work. But in a developing country like India, due to the lack of proper nutritious food facilities to the forest workers in the far flung areas which is making it very difficult to enhance their capacity to do work. Moreover, amount of physical work load on the individuals further deteriorate their condition to work. The after effects of heat stress in tropical forests of our country are very common. The working in temperate and cold desert areas is also a tough task and sometime claims the lives of the workers.

Flora and Fauna

Generally, the workers encounters many problems in terms of injuries, infections or allergic reactions due to contact with plants, thorns and splinters, poisonous plants, insect and sometimes even animals in the forests. Therefore, special attention is required to be given to the workers so as to make them aware of these risks and make them able to recognize the plants, the symptom of illness and the simple treatments required. Both wild as well as domestic animals affect the workers in the forests, as their behaviour is unpredictable and a lot of care, patience and calm is required. Wild elephants are becoming a great risk to the workers as well as forest dwellers because of reduction in their habitat. Thus, the workers are required to be specially trained and educated so that they are able to protect themselves while working in the forests and this can only be possible with proper implementation of scientifically and ergonomically sound principles.

Conclusion

Ergonomics have a wider scope of applicability in forestry of developed as well as developing countries in the world. Human abilities may be characterized not only with reference to the generic human operator but also with respect to those with more particular abilities that are called upon in specific situations where high performance is essential. Ergonomics studies the efficiency of person in their working environment and has been relatively neglected so far in developing countries like India. The reason is the lack of human and financial resources as well as the low socio-economic status of workers involved. The management of forests in India requires more physical strength and the workers are in need of high-energy food with proper health and medical services. Which are generally poor. Therefore, there is a need to provide proper training and instructions, particularly at technical and vocational level, so as to train and educate the workers. Today, with the mechanization and use of improved, expensive and sophisticated equipment's, there is a need to improve the socio-economic status as well as living conditions of the workers so as to enhance their work efficiency to the maximum. This is only possible if scientifically sound ergonomic principles are applied in order to make forest work a productive and progressive occupation.

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