
SHORT NOTES

Status of ergonomic studies in Nepal's forestry works

Raj Bahadur Shrestha¹

Argonomy which is the study of work, worker, and working environment is meant for the welfare of a worker being put in a certain working condition. Therefore, it is a scientific study of Work Physiology; Occupational Health and Safety; Nutrition and Energy in-take and out-take of a Worker; Working Postures; Anthropometry; Machine and Tools; Work Organisation; Working Environment, etc.

Forestry work is considered as one of the most strenuous and dangerous occupations. Within this occupation, works range from raising seedlings to tree harvesting in which, logging operation is the heaviest and hazardous one. Based in studies done in other countries, it involves much heavy and demanding physical effort as compared to other occupations. Shrestha (1995) estimated that the average energy expenditure in fuelwood cutting is 3.9 kcal per min). Energy consumed in forestry works have also been estimated by Apud *et al.* (1989) and Maleta and Sood (1984) which is shown below:

| Forestry Work | Mean energy expenditure |
|---|-----------------------------------|
| Seedling planting by hand | 6.05 kcal per min per 65 kg man* |
| Tree felling by axe | 10.00 kcal per min per 65 kg man* |
| Carrying logs | 12.10 kcal per min per 65 kg man* |
| Tree felling by hand saw (Raker saw) | 4.63 kcal per min per 44 kg man** |
| 5. Tree felling by hand saw (Peg toothed) | 5.47 kcal per min per 44 kg man** |
| 6. Cross-cutting by Raker saw | 4.05 kcal per min per 44 kg man** |
| 7. Cross-cutting by axe | 7.90 kcal per min per 44 kg man** |

Considering that forestry work is high physical energy demanding, a forest worker should work at a certain time of the day along with frequent rests. For example, any one who feels high breathing or sweating should not be allowed to continue the job.

Working capacity of a worker depends on the altitude he is working and oxygen intake by him.

The working capacity decreases at elevation above 1200 meters, it reduces by 15 percent at 2300 m. and 30 percent at 4000 m. (Kantola and Virtanen, 1986). However, after acclimatisation it reduces by half. Thus, in the high altitude, worker becomes tired very soon in the beginning.

Working posture is another important factor. Adopting proper posture increases working efficiency. At the same time it prevents injuries and other occupational health problems. For example, a worker should be in squatting position to lift the log easily. And, it prevents the possibility of disk prolapsed.

To avoid the prolonged working positions and boredom, job rotation is also necessary. Besides, it increases output and decreases work strain which has been shown below:

| Description | without rotation | with rotation |
|----------------------------------|------------------|---------------|
| Output per day (m ³) | 129.9 | 141.0 |
| Average heart beat* per minute | 106 | 96 |

After Apud and Valides (1993)

Work load which is measured in terms of heart beat per minute and this should not exceed an average 115 beats per minute for a 20 year old worker.

Therefore, the basic concept of the ergonomics is to optimise man-work system, with a view towards improving workers' health, safety, well being, and efficiency. This is the reason why ergonomical principles should guide the work in order to have productivity in the forestry job with relation to the working capacity of a worker. Otherwise, over workload causes stress, and ultimately leading to health problems and even fatal accidents. Because of these factors, workers who are involved in forestry works should know how to avoid un-necessary stress and strain.

Present scenario of ergonomy in Nepal's forestry

Despite ergonomy bears high importance amongst countries involved in heavy forestry works, the same in Nepal has not been realised yet. Those

¹ Technical Consultant, NARMSAP, Babarmahal, Kathmandu

Nepal people, who are involved in many kinds of forestry jobs ranging from planting seedling to sawing logs, have been facing minor, major or even fatal injuries. Seldom, such incidents are covered in media, nor they have been well recorded.

In addition, forest workers in Nepal have not been taught of the proper working techniques. Therefore, they might have undergoing high workload only because of faulty working postures. Consequently, the need of balanced foods in order to meet the energy requirement of a worker is difficult to get. The possibility that the workers are facing occupational health problems such as anemia, dehydration, muscular cramps, and cardiovascular diseases, could not be denied in Nepal. Workers facing heat stroke in the Terai is common.



Inappropriate working posture of Nepali forestry workers

In Nepal, accumulation of information related to ergonomics has been an utmost need. It is an unexplored field of study for the forestry professionals. The significant role that it plays in forestry should be realised so that unnecessary accidents and occupational health problems of the forestry workers could be avoided. This will improve working efficiency with lower input.

Conclusion

In forestry works, the intention of the employer and worker is to avoid unnecessary work stress and physical hazard. To overcome this problem, making the people aware about the ergonomical working environment is needed. Taking help from organisations such as International Labor Organization (ILO) and donors can be beneficial in carrying out the much needed ergonomical study in Nepal.

Reference

- Apud, E., Bostrand, L., Mobbs, I. D., and Stehlke, B. 1989. *Guidelines on ergonomic study in Forestry*. ILO publication, Geneva.
- Apud, E., and Valdes, S. 1993. *Ergonomics in Forestry*. ILO publication.
- Kantola, M., and Virtanen, K. 1986. *Handbook on appropriate technology for forestry operations in developing countries, Part I*, Helsinki, Finland.
- Maleta, B. P., and Sood, K. G. 1984. Physiological strains of forest workers, an article published in *Indian Forester*, 4: 110-113
- Shrestha, R. B. 1995. Study of fuelwood cutting in plantation of *Prosopis juliflora* in Eastern Kenya, Kenya, A M. Sc. thesis published by Forest Management and Utilization Development Project, HMG/N/FINNIDA, Kathmandu, Nepal.