

FOREST ENGINEERING AND ENVIRONMENT PROTECTION

P.CH. ESKIOGLOU

Department of Forestry and Natural Environment
Aristotle University of Thessaloniki
54124 Thessaloniki, Greece
E-mail: pxeskio@for.auth.gr

EXTENDED ABSTRACT

The forest ecosystems are dominant ecosystems in our planet and contribute decisively to the protection of the environment. Their protection and their sustainability are carried out by technical and biological interventions. The scientific part which protects the forests, is technically the Forest Engineering which is devoted to designing, controlling and developing technical systems in forestry such as transportation systems and systems to influence natural processes in mountainous regions (erosion, water hazards and landslides). The soil erosion in the forest ecosystems is a phenomenon with severe impacts not only to them but also to the wider environment. More specifically, the erosion for which are liable the non-environment-friendly forest opening-up and forest road construction works, is one of the most severe contemporary problems which the forest engineers are called upon to solve out with direct interventions aiming at their minimization.

In our laboratory, during the recent years, we are working out towards this direction in order to record the causes that create erosion. Such causes are the slopes and the cross-sections of the forest roads which do not help in removing away the precipitations, the entrance of forest works machinery which are incompatible to the topographic relief, and finally the improper design of pavements of the forest roads.

In our paper, conducted in the area of Pertouli University Forest at an altitude of 1000 m and with a fir forest vegetation, are presented the results of a research which includes: a) The best opening-up, the correct layout of a forest transportation network and the rational introduction of transportation means in respect to the cross-cut gradient and the surcharge of soils, following a data processing by the Geländeklassifikation und Abgrenzung der Rückeverfahren Program, β) Stabilization of experimental plots in high slopes of forest roads with a gradient up to 75%. It has been proved that the combination of plant coverage, bitumen emulsion and marble dust provides the best economic and technical results, c) Economic planning for a resistant layer thickness of forest roads, emphasizing on the calculation of the trafficking load so that to avoid the over-consumption of natural resources on one hand and the erosion on the other, d) Development of a vulnerability model for gully and pothole distresses of aggregate surfaced low-volume roads. It was found that the Cambered cross - section grading reduces gully distresses by a factor of about 2 compared with horizontal grading, and canopy protection of roads reduces gully occurrence by a factor 1.4

Key words: Forest ecosystem, forest road, slope stabilization, soil erosion, expression Burlet, vulnerability, gully, pothole.