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Secondary opening of sloped terrain forests – a GIS study for timber skidding

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Optimal primary and secondary forest transportation infrastructure are essential premise for quality, professional, comprehensive, rational and economically justified management of forest ecosystem. In Croatia, both in even-aged and selective forests on slopes, timber extraction is done by skidders. Because of the terrain features, secondary forest roads (skid roads/tractor roads) must be constructed. Construction costs represent a significant amount in the overall cost of timber harvesting and therefore the planning stage of secondary forest transportation system should be given a special attention.

Studies were conducted in MU "Bovan-Jelar" Forest Office Perušić, Forest Administration Gospić which is located in the hilly and mountainous territory of Croatia. After the establishment of forest roads cadastre and the analysis of existing primary and secondary openness (along with the definition of unopened, insufficiently opened and low quality opened forest areas) and after completion of the optimization of the primary forest road network, optimizing of secondary forest road network was conducted (designed for the skidder winch rope length of 45.00 m). Depending on different assumption parameters such as quantitative, qualitative and cost features, three versions of the secondary forest opening were compared: the current state of forest openness, the current – enhanced state of forest openness and "zero" state (a simulation of secondary forest opening from the beginning of optimization process).

Achieved results indicate the necessity of planning phase implementation when establishing optimal forest road network in the field. Forest opening should be comprehensive, primary and secondary, with mandatory application of GIS technology. Professional and careful forest opening can significantly increase the effectiveness of each skid road and secondary forest road network in general and at the same time reduce the overall costs of timber harvesting.