PROPOSAL OF FOREST ROAD RE-ENGINEERING IN THE AREA OF STATE FOREST IN JEZERSKO (Slovenia)

Andrea Penasa, Andrei Aphaian, Fabio Bottazio, Giulia Roder, Matea Lukač, Nino Loreto, Thomas Quetri, Tomi Kaakcurjraava, Zvonimir Sučić

INTRODUCTION

The main purpose of the Integrated Rural Road Network Re-engineering (IRRNR) Summer School is to provide the students with a broader view on issues related to forest roads planning and building in the Slovenian Alpine Region. One of the guide points of the project work was to define suggestions and proposals to improve the actual accessibility to the forested areas. A preliminary analysis consisted in the identification of the most critical parts all over the state forest property, based on selecting the forest roads with the steepest slopes or the shorter curvature radius, that are the main limiting factors for their accessibility. Our approach was to focus on one specific area, more than on a broad scale, where critical situations are excluding the access to the vehicles used for wood extraction. Field data were collected in order to allow specific elaborations in GIS environment and planning actions with an engineering software. Various maps were produced in order to have more detailed information pre and post operation and effective visual representations.

RESULTS: RE-ENGINEERING OF PRESENT FOREST ROAD NETWORK

Critical points
• High steepness of forest roads
• Lack of proper drainage system
• Bad safety conditions
• High costs of maintenance
• Narrow turning radius
• Only one viable road to reach the uphill forest area
• Difficult morphology of the area

Suggestions
• Re-engineer 534 m of road
• Asphalt 478 m for a width of 3.8 m
• Increase the two turning areas
• Increase the curvature radius
• Improve the drainage system

RESULTS: CONSTRUCTION OF NEW FOREST ROADS

Critical points
• Limited accessibility for cable yarding positioning
• Presence of ridges and gorges
• Steep slopes
• Long skidding trails

Suggestions
• 1072m of new road
• Exchange points
• Lateral ditch and culverts
• Turning/funding area
• Cribwalls
• Crown shaped road

COSTS

<table>
<thead>
<tr>
<th>Grade (%)</th>
<th>New road construction</th>
<th>Re-engineering project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.33</td>
<td>14.6</td>
</tr>
<tr>
<td>Fill volume (m3)</td>
<td>2462</td>
<td>118</td>
</tr>
<tr>
<td>Dug volume (m3)</td>
<td>3506</td>
<td>4</td>
</tr>
<tr>
<td>Length (m)</td>
<td>1072</td>
<td>534.0</td>
</tr>
<tr>
<td>Cost rate (€/m)</td>
<td>42.7</td>
<td>87.3</td>
</tr>
<tr>
<td>Maintenance (€/m)</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Total Price (€)</td>
<td>45,399€</td>
<td>44,308€</td>
</tr>
</tbody>
</table>

CONCLUSIONS

• Increased connectivity and functionality of existing roads
• Drainage system improved
• New forested areas reachable for cable yarding extraction
• Improvement in the access to the skidding trails

SUGGESTIONS

• Increase the regular maintenance of the existing roads
• Valuate conversion of skidding trails to forest roads

PROJECT EFFECTS

<table>
<thead>
<tr>
<th>Effects</th>
<th>Current situation</th>
<th>New forest road</th>
<th>Re-engineering forest road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem</td>
<td>-</td>
<td>++</td>
<td>0</td>
</tr>
<tr>
<td>Productivity</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Safety</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Tourism</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Maintenance</td>
<td>+</td>
<td>--</td>
<td>++</td>
</tr>
<tr>
<td>TOTAL</td>
<td>-</td>
<td>++</td>
<td>+++</td>
</tr>
</tbody>
</table>