



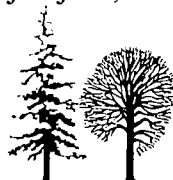
11) = 3784614



**WP6 : Forest and Industry Connectibly  
Action 6.1**

**GENERAL PRESENTATION OF THE WOOD TRANSPORT SECTOR  
IN SLOVENIA**

Prepared by:  
Matevž Triplat  
Ljubljana, 2013



**GOZDARSKI INŠTITUT SLOVENIJE**  
SLOVENIAN FORESTRY INSTITUTE

GOZDARSKA KNJIŽNICA

GIS K E  
650

GIS BF - GOZD.



1201400055

COBISS





## 1. General description

Road and railway wood transport system are most commonly used in Slovenia. In many cases it is combination of both types, especially in case of export to other countries. However the most important for wood transportation is still road transportation, railway is more often used for energy wood transport. Sector of wood transport is very specific; these wood transport compositions are not suitable for transporting other goods and this is the biggest problem for optimization of logistics, because on every full ride there follows empty ride and due to that cost are increasing.

## 2. Fleet composition

We have separated wood transport into two phases. First is the skidding of wood which goes from standing tree to forest road or temporary storage area in forest. First phase can be done with different types of agricultural tractors (with or without trailer), cables yarding, skidders, forwarders or so on.

The second phase is transport of logs that goes on forest road and public roads. In this paper we will report only about this phase of wood transport which is in almost all cases done by usage of timber trucks. Forest roads are in most cases the limitation factor for decision of what fleet composition can be used in selected area. Technical aspects of forest road are described under wood transport regulations. Transport entrepreneurs are using different fleet compositions at the same time. This is how they optimize costs due to different site conditions. Each type of transportation has its own features and decision it's made based on productivity of each composition.

Different fleet compositions:

**Composition for transporting short roundwood** is generally combined with truck and two axles trailer (in some cases three axles). Three axle trucks is in most cases equipped with heavy hydraulic crane which is positioned in the back and can load truck (with logs up to 6m) and trailer (logs up to 8m) without any delays.

**For transportation of long roundwood** composition of truck with semitrailer is most commonly used in Slovenia. It can come with the crane behind the cabin. But in last five year's export of roundwood is increasing in Slovenia (especially to Austria and Italy) and in most cases these trucks for long distance transportation are without heavy crane.

Nowadays transportation of wood chips is very important. In case of short (up to 100km) distances it is in most cases done by roll-off containers trucks with or without trailer (one container can carry up to 40 loose m<sup>3</sup>). These are trucks with exchangeable containers which can be brought to chipping machine at forest road site. Empty container can be unloaded and full container can be loaded using hook lift. For long distance transportation any bulk carrier based on semi-trailer with walking floor (up to 90m<sup>3</sup>) can be used.

According to the data obtained from the Statistical Office of Slovenia the numbers of transport compositions are only for entrepreneurs that are registered only for forest wood sector. This number did not change much in last years (Table 1). Slovenian transport sector is quiet developed and some of those entrepreneurs also offer transport of wood.

Table 1: Number of truck, trailers and timber lorries used in companies registered as forest entrepreneurs (situation on 31/12/2011 according to Statistical Office of Slovenia).

|                     | Number of devices | Number of entrepreneurs |
|---------------------|-------------------|-------------------------|
| Truck               | 115               | 27                      |
| Truck trailer       | 78                | 23                      |
| Truck semitrailer   | 49                | 10                      |
| Forwarder           | 15                | 12                      |
| Tractor semitrailer | 27                | 22                      |
| Loading crane       | 90                | 21                      |

### 3. Information on wood transport regulations in terms of maximum payload and max length of the products

**Regulations of truck transport** are in Slovenia managed by Road Traffic Safety Act. Maximum dimensions of trucks and its load are arranged by Rules on dimensions, masses and equipment of vehicles. According to this rules trucks of any kind may not exceed 4,2 meters of height and 2,55 meters of width. Maximum length is regulated on the type of transportation:

- 12 meters for single trucks,
- 18, 75 meters for lorry with semi-trailer,
- 16, 5 meters for lorry with trailer.

Maximum weight for truck may not exceed 18 tons in case of two axles, 25 tons in case of three axles and 32 tons in case of four axles. For trucks with trailer maximum weight is limited on 40 tons. Only exceptions are trucks that carry containers and are due to EU directive limited to 44 tons.

**Regulation for construction of forest roads** is managed by Rules on forest roads (2009). Technical demands (for building new or at reconstruction of an old forest road) are regulated with this paper:

- Road carriage width (also running width) in tangent alignment up to 3,5m.
- Minimum radius of circular curve on centreline in horizontal alignment is 9,0m; when horizontal curve with below 50m radius is applied the carriageway width widening shall be designed.
- Maximal vertical gradient of road sub-base is 12%; higher vertical grades and zero vertical grade require additional argumentation in technical report.
- Minimal radius of vertical curves is 350 meters; lower values require additional argumentation in technical report.
- Gutter, shoulder or corridor should have horizontal width at least 0,5m.
- The carriageway cross fall (also lateral gradient) should be at least 3%.

### 4. Equipment trend for wood transport

Some enterprises already started using GPS Fleet Management System. However as it known to us, they do not use it for optimisation of logistics, but more for supervision of employees and locating trucks in case of burglary (lorries and in last times also oil). For navigation they use GSM conversation or more or less known systems for guidance with no extra information's on restrictions for timber lorries (Garmin). Such guidance system is appropriate only for public roads and is very inaccurate for forest roads. Logistical information's are based on local forest entrepreneurs or local forest service. Also systems that are commonly used for navigations don't include accurate forest road information's.

## 5. Structural and organisational aspects of the transport sector

Most of small-scale forest owners in Slovenia decide to sell wood thru forest transport entrepreneurs. Forest entrepreneurs use different types of management, but in most cases it goes for Gantt chart. Decision on optimal fleet composition to use is done based on the site conditions and type of cutting technology. Another decision making factor is also transport distance, in case of long-distance transportation most entrepreneurs are using truck without hydraulic crane, because it's too heavy and it only produces extra weight in case of maximum payload. In general it goes for transport of short logs (4m), long logs (8m-12m) and transport of woody biomass (using containers). In Slovenia it is very rare that sawmill will have own fleet. Large and medium forest companies in common have their own fleet (5-15 trucks/trailers). Forest transport entrepreneurs are specialized for transport from forest roads to end consumer (sawmill...). Along these companies we can notice also some small private own companies with 2-5 forest transport compositions. According to increasing wood exportation there is expected further development of long distance transport sector.

## 6. Wood procurement of mills

The state of the Slovenian sawmill industry has changed considerably in the last years. In research (conducted in year 2007) done by analysing the questionnaire, the total capacity of the sawmills was established. It is 810.030 m<sup>3</sup> of timber, representing 48% of the available timber for 2007. The bigger plants have increased their capacities, and have become technologically more advanced. However, they are still technologically behind sawmilling plants abroad. 40% of the sawmill plants sell their products abroad (Perme, 2007). According to data of Slovenian statistical office we notice decreasing trend in wood processing industry

| 1. Number of legal entities operate on                 | 2008 | 2009 | 2010 | 2011 |
|--|------|------|------|------|
| 02.200 Logging   | 201  | 209  | 218  | 237  |
| 16.100 Sawmilling and planing of wood                  | 510  | 533  | 512  | 539  |
| 16.210 Manuf. of veneer sheets and wood-based panels   | 33   | 36   | 36   | 40   |
| 16.220 Manuf. of assembled parquet floors              | 7    | 6    | 6    | 6    |
| 16.230 Manuf. of other builders' carpentry and joinery | 564  | 578  | 583  | 582  |
| 16.240 Manuf. of wooden containers                     | 166  | 161  | 159  | 148  |
| 16.290 Manuf. of other products of wood                | 436  | 427  | 398  | 377  |
| 31.010 Manuf. of office and shop furniture             | 478  | 468  | 461  | 440  |
| 31.020 Manuf. of kitchen furniture                     | 139  | 154  | 170  | 177  |
| 31.090 Manuf. of other furniture                       | 463  | 460  | 484  | 479  |

Source of information: SURS

| 2. Number of employees                                 | 2008  | 2009  | 2010  | 2011  |
|--|-------|-------|-------|-------|
| 02.200 Logging   | 947   | 876   | 842   | 810   |
| 16.100 Sawmilling and planing of wood                  | 1.576 | 1.383 | 1.287 | 1.339 |
| 16.210 Manuf. of veneer sheets and wood-based panels   | 1.751 | 1.604 | 1.750 | 1.443 |
| 16.220 Manuf. of assembled parquet floors              | 15    | 14    | 13    | 11    |
| 16.230 Manuf. of other builders' carpentry and joinery | 4.644 | 3.827 | 1.310 | 3.286 |
| 16.240 Manuf. of wooden containers                     | 383   | 151   | 329   | 350   |
| 16.290 Manuf. of other products of wood                | 1.523 | 1.207 | 1.074 | 1.013 |
| 31.010 Manuf. of office and shop furniture             | 2.389 | 2.324 | 1.986 | 1.521 |
| 31.020 Manuf. of kitchen furniture                     | 2.239 | 1.829 | 1.626 | 1.346 |
| 31.090 Manuf. of other furniture                       | 4.796 | 4.197 | 4.037 | 3.175 |

Source of information: SURS

In last decade we are noticing increased amount of export to neighbour countries, mainly it goes for export of round wood of conifers to Austria and fire wood to Italy. Export of unprocessed timber

means a lot of damage to the national economy, the problem also has a wood processing industry, which has to search for round wood elsewhere for higher prices. This fact worsens its competitiveness and results as rise in prices of timber on the domestic market and lack of certain forest products. The decreasing trend of industrial roundwood consumption in Slovenia, which has been prominent since 2007, continued also in 2012. The production and export are reaching their highest levels while the log wood processing is dropping (-12%). On the other hand, pulpwood board's consumption is on the rise (+17%) (UNECE, 2013).

| Roundwood repurchase, Slovenia, Yearly     | 2008        | 2009        | 2010        | 2011        | 2012        |
|--|-------------|-------------|-------------|-------------|-------------|
|  | Amount (m3) | Amount (m3) | Amount (m3) | Amount (m3) | Amount (m3) |
| Roundwood - coniferous, SUM                | 281000      | 245000      | 217000      | 287000      | 310000      |
| Roundwood, oak                             | 21000       | 17000       | 11500       | 14000       | 11000       |
| Roundwood, beach                           | 65000       | 35000       | 29500       | 32500       | 2200        |
| Roundwood, other non-coniferous            | 11000       | 6000        | 5000        | 5500        | 6000        |
| Pulpwood, coniferous                       | 69000       | 62000       | 56000       | 64000       | 68000       |
| Pulpwood, non-coniferous                   | 29000       | 16000       | 18000       | 37000       | 47000       |
| Other industrial roundwood, coniferous     | 21000       | 19000       | 17000       | 21000       | 11000       |
| Other industrial roundwood, non-coniferous | 6000        | 25000       | 17000       | 23000       | 26000       |
| Wood fuel, coniferous                      | 4000        | 5000        | 9500        | 10000       | 6000        |
| Wood fuel, broadleaf                       | 31000       | 32000       | 37000       | 40000       | 26000       |

| Import of roundwood (m3), Slovenia, yearly                                 | Import |        |        |        |        |
|--|--------|--------|--------|--------|--------|
|  | 2008   | 2009   | 2010   | 2011   | 2012   |
| Roundwood - SUM  | 241000 | 261000 | 307000 | 448000 | 460000 |
| Industrial roundwood - SUM   | 160000 | 164000 | 194000 | 246000 | 204000 |
| Industrial roundwood - coniferous  | 48000  | 59000  | 60000  | 104000 | 119000 |
| Industrial roundwood - non-coniferous                                      | 112000 | 105000 | 134000 | 142000 | 85000  |
| Sawlogs and veneer logs - sum  | 35000  | 33500  | 45000  | 58000  | 25000  |
| Sawlogs and veneer logs - coniferous                                       | 8000   | 6500   | 10000  | 16000  | 4000   |
| Sawlogs and veneer logs - non-coniferous                                   | 27000  | 27000  | 35000  | 42000  | 21000  |
| Pulpwood (round and split) and other industrial roundwood - sum            | 125000 | 129000 | 148000 | 187000 | 179000 |
| Pulpwood (round and split) and other industrial roundwood - coniferous     | 40000  | 52000  | 49000  | 88000  | 115000 |
| Pulpwood (round and split) and other industrial roundwood - non-coniferous | 85000  | 77000  | 99000  | 99000  | 64000  |
| Wood fuel - SUM  | 81000  | 98000  | 113000 | 203000 | 256000 |

| Export of roundwood (m3), Slovenia, yearly                                 | Export |        |        |         |         |
|--|--------|--------|--------|---------|---------|
|  | 2008   | 2009   | 2010   | 2011    | 2012    |
| Roundwood - SUM  | 724000 | 767000 | 844000 | 1142000 | 1324000 |
| Industrial roundwood - SUM   | 475000 | 507000 | 565000 | 808000  | 1028000 |
| Industrial roundwood - coniferous  | 274000 | 306000 | 337000 | 513000  | 670000  |
| Industrial roundwood - non-coniferous                                      | 201000 | 201000 | 228000 | 295000  | 358000  |
| Sawlogs and veneer logs - sum  | 266000 | 294000 | 350000 | 524000  | 690000  |
| Sawlogs and veneer logs - coniferous                                       | 171000 | 204000 | 257000 | 411000  | 526000  |
| Sawlogs and veneer logs - non-coniferous                                   | 95000  | 90000  | 93000  | 113000  | 164000  |
| Pulpwood (round and split) and other industrial roundwood - sum            | 210000 | 212000 | 215000 | 284000  | 338000  |
| Pulpwood (round and split) and other industrial roundwood - coniferous     | 103000 | 102000 | 80000  | 102000  | 144000  |
| Pulpwood (round and split) and other industrial roundwood - non-coniferous | 107000 | 110000 | 135000 | 182000  | 195000  |
| Wood fuel - SUM  | 245000 | 260000 | 280000 | 334000  | 295000  |

Source of information SURS, analysed by Slovenian Forestry Institute.



## 7. References

Perme M. 2009. Analiza stanja slovenske žagarske industrije. Dipl. Delo. Univerza v Ljubljani. Biotehniška fakulteta. Oddelek za lesarstvo. Str. 66

2009a. Pravilnik o gozdnih prometnicah. Uradni list RS št. 4/2009.

UNECE. 2013. Country market statement.

<http://www.unece.org/forests/fpm/marketreports.html>  
(5.12.2013)

SURS. 2013. Letna poročila. <http://www.stat.si/> (5.12.2013)

GIS K E  
650



1201400055

COBISS •

GIS BR - 6020