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# System for establishing intradepartmental prices in slovak wood processing industry

## Sustav za utvrđivanje cijena među odjelima slovačke industrije za preradu drva

### Stručni rad • Professional paper

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**ABSTRACT** • *The objective of this paper is the application of a possible alternative for establishing interdepartmental prices in the practice of a wood processing company. This alternative would be a verification of the basic assumptions for optimisation of planning and managerial decision-making.*

**Key words:** *intradepartmental price, costs, profit, contribution margin, calculation*

**SAŽETAK** • *Cilj je ovoga rada primjena mogućega alternativnog postupka za utvrđivanje cijena među pojedinim odjelima tvrtki za preradu drva. Ta bi alternativa bila potvrda osnovnih pretpostavki za optimizaciju planiranja i menadžersko donošenje odluka.*

**Ključne riječi:** *cijene među odjelima, troškovi, dobit, kontribucijska marža, kalkulacija*

## 1 INTRODUCTION

### 1. UVOD

The system for establishing intradepartmental prices is the basic element for measuring the output of lower organizational units. Nowadays such system is necessary because of the trend of decentralization and transfer of management responsibilities to lower organizational units (branches, operations, centres, etc.). It determines the conditions for measuring the output of lower organizational units, and also for optimizing the processes of planning and managerial decision-making.

This system is required so as to establish the right structure of the company, especially large-scale companies with complex organization, where the company

is made of several organizational units, such as divisions, which are divided into individual business centres. This system identifies how to determine the output price of lower organizational units. Through such a system it is also possible to allocate costs to individual centres. Although these costs do not have to be incurred directly by these units, they are treated as such because the units use the outputs of other intradepartmental centres.

## 2 CALCULATION OF COSTS TO OUTPUTS

### 2. KALKULACIJA TROŠKOVA PROIZVODA

The calculation can be expressed as an activity. Its aim is to establish the actual, alternatively calculated costs and other pricing elements incurred by the calcu-

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lating unit. The calculation is the result of these activities. The calculating scheme has a certain integrated structure and it indicates the value of costs and other pricing elements of the calculation. The term - calculation of costs to outputs is understood in two ways:

- as an activity determining the costs to outputs,
- as a result of this activity (actual calculation of costs incurred by the calculating unit).

All kinds of outputs can become the subject of calculation. Not only the output achieved by the company, or by a third party that provides services, but also individual kinds of outputs (semi-finished product) provided "internally" for the rest of the company (centres, divisions, operations).

According to the structure of costs, which is expressed as a calculating pattern, costs are divided into price calculation and cost calculation (Šatanová and Stadrukerová, 2002).

The cost calculation represents the value of invested capital determined by the estimate of its economic efficiency in individual sections of the company. The price of the final product is determined by summing up the profit margins.

The price calculation represents the costs with respect to the selling prices of the products. It shows the costs from the aspect of investment effectiveness. This is the so-called retrospective style of calculation.

The outputs of individual centres of the company can be measured so as to express the actual values, and also the value of intradepartmental prices. The development of the optimum system for establishing intradepartmental prices is directly related to the objectiveness in planning managerial tasks of individual centres. Generally, there are two basic approaches to establishing the intradepartmental prices (Král, 2001):

- Estimate of intradepartmental price subject to the *selling price* level,
- Estimate of intradepartmental price subject to the cost calculation (based on complete or incomplete - variable costs).

On the basis of two basic approaches, seven alternatives of intradepartmental prices were deduced by Klenger (In: Rajnoha, Podnikové plánovanie, 1999), which may be used for the assessment of intradepartmental outputs. These alternatives are as follows:

### 3 CHARACTERISTICS OF PRODUCTION PROCESS

#### 3. OBILJEŽJA PROIZVODNOG PROCESA

Each manufacturing company has a unique production process, which depends on the industrial sector. This uniqueness is a result of technological development and organizational structure of the company. The flow of materials and outputs – semi-finished products and services can be determined from the organizational structure. This flow usually begins with the supply and after the transformation in the production process it ends with sales.

In the selected wood-processing company, supply and marketing activities are carried out on a commercial basis. All costs related to the supply and sales are transferred into individual centres by the scheduling key (the volume of production expressed by sales). The whole production process with the action of materials and outputs can be seen in the flowchart presented in Figure 2 along with supply–customer’s relations. Beside these outputs, there is a whole production process cross referenced to drying and steaming outputs in the drying storerooms.

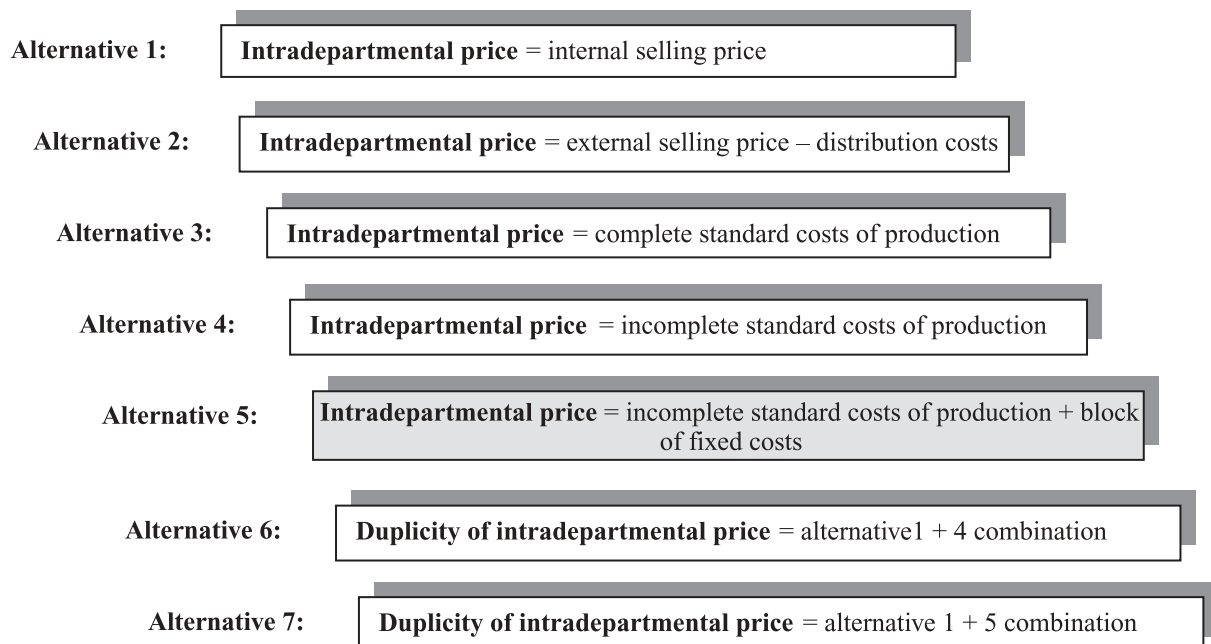


Figure 1 Potential alternatives of intradepartmental prices  
Slika 1. Mogući prijedlozi određivanja cijena u pojedinim odjelima

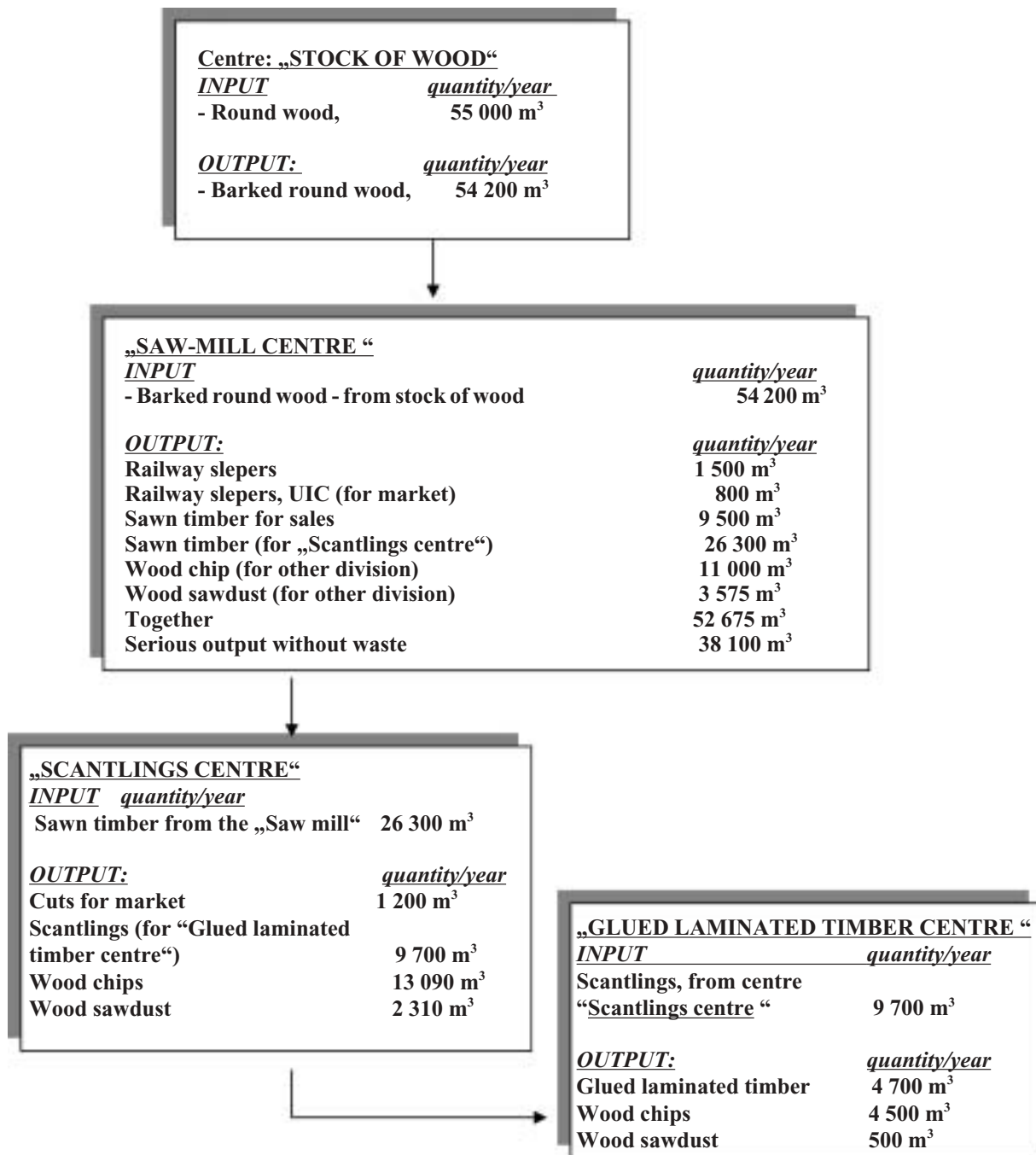


Figure 2 Production process flowchart showing materials and outputs

Slika 2. Shema proizvodnog postupka koja predočuje količine materijala i proizvoda

#### 4 ALLOCATION OF COSTS TO OUTPUTS 4. RASPODJELA TROŠKOVA PROIZVODA

The allocation of costs to outputs must be determined by the kind of costs, which are allocated to individual centres (Table 1). Basically this is done by scheduling parameters with direct or indirect allocation. Such an allocation excludes the item „direct costs of material“. This cost item should be calculated in accordance with progressive grossing up of material costs (Schváb, 2004). It depends on specific features of technological processing of material in the sector of wood processing industry.

#### 4. 1 Method of progressive grossing up of material costs

##### 4.1. Metoda progresivnog određivanja troškova materijala

This method depends on specific features of technology in wood-processing industry and on mechanical and physical properties of wood. The basic idea is to gross up the variable costs of material per a unit of production (m<sup>3</sup> of wood pole, sawn timber, scantlings, etc.) and to deduct the value of solid waste. This progressive method can be simply described as follows: variable costs of total input material are decreased by useful wa-

**Table 1** Allocation of costs to individual centres (expense items are in thousand SKK since 2004)

**Tablica 1.** Raspodjela troškova prema pojedinačnim mjestima troška (troškovi su iskazani u tisućama SKK od 2004)

	<b>Expense items / centre</b> <i>Stavke troškova/ mjesto troška</i>	<b>Sawmill centre</b> <i>Pilana</i>	<b>Scantlings Centre</b> <i>Odjel za izradu elemenata</i>	<b>Glued lam. tim. centre</b> <i>Odjel za izradu lamelirane građe</i>	<b>Administr. Centre</b> <i>Administracija</i>	<b>Division Together</b> <i>Ukupni troškovi</i>
1	Amortization <i>amortizacija</i>	4 189.0	9 953.0	11 300.0	12.0	25 454.0
2	Property insurance <i>osiguranje imovine</i>	419.8	295.9	443.8	260.0	1 419.5
3	Charges for wood and air <i>troškovi sirovine i zraka</i>	211.4	30.0	6.0	-	247.4
6	Realty tax <i>porez na nekretnine</i>	491.4	46.9	243.8	-	782.1
7	Interest <i>kamate</i>	1 432.0	4 500.0	4 222.0	-	10 154.0
	<b>Fixed cost together</b> <i>ukupni stalni trošak</i>	<b>6 743.6</b>	<b>14 825.8</b>	<b>16 215.6</b>	<b>272.0</b>	<b>38 057.0</b>
8	Electricity <i>struja</i>	4 459.3	5 755.2	7 372.5	-	17 587.0
9	Steam <i>para</i>	1 810.5	1 542.8	6 540.1		9 893.4
10	Water <i>voda</i>	217.1	54.7	67.4	-	339.2
11	Separation <i>razdvajanje</i>	811.2	734.7	2 281.		3 827.6
	<b>Energy + separation together</b> <i>energija + razdvajanje, ukupno</i>	<b>7 298.1</b>	<b>8 087.4</b>	<b>16 261.7</b>	<b>-</b>	<b>31 647.2</b>
12	Lowers <i>minimalna plaća</i>	9 900.0	11 124.0	13 200.0	4 697.0	38 921.0
13	Social welfare <i>socijalno osiguranje</i>	3 762.0	5 251.8	6 371.1	1 773.1	17 158.0
14	Social costs <i>socijalni troškovi</i>	-	-	-	1 385.0	1 385.0
	<b>Personal cost together</b> <i>ukupni troškovi osoblja</i>	<b>13 662.0</b>	<b>16 375.8</b>	<b>19 571.1</b>	<b>7 855.1</b>	<b>57 464.0</b>
15	Fuelling <i>gorivo</i>	633.6	149.5	347.5	123.0	1 253.6
16	Repairs <i>popravci</i>	8 603.0	2 146.0	7 200.0	-	17 949.0
17	Phone + fax <i>telefon + faks</i>	-	4.8	1.8	23.4	30.0
18	Stationery <i>uredska oprema</i>	12.0	6.0	6.0	30.0	54.0
19	Security <i>sigurnosne mjere</i>	180.0	100.0	90.0	-	370.0
20	Travel cost <i>troškovi putovanja</i>	-	-	-	172.0	172.0
21	Translator services <i>služba prevođenja</i>	-	-	-	7.0	7.0
22	Cleansing articles <i>tumačenje odredbi</i>	20.0	10.0	15.0	-	45.0
23	Training <i>usavršavanje</i>	20.0	12.0	16.0	-	48.0
24	Promotion <i>promocija</i>	-	-	-	60.0	60.0
25	Representation <i>prezentacija</i>	-	-	-	6.0	6.0
26	Subsidiary material <i>pomoćni materijal</i>	367.0	453.0	80.0	-	900.0

Expense items / centre <i>Stavke troškova/ mjesto troška</i>		Sawmill centre <i>Pilana</i>	Scantlings Centre <i>Odjel za izradu elemenata</i>	Glued lam. tim. centre <i>Odjel za izradu lamelirane građe</i>	Administr. Centre <i>Administracija</i>	Division Together <i>Ukupni troškovi</i>
27	Colour, toners <i>boje, toneri</i>	8.0	-	-	40.0	48.0
28	Cleaning <i>čišćenje</i>	147.4	75.4	34.5	-	257.3
29	Liquidation <i>likvidacija</i>	19.8	2.0	21.2		43.0
30	Check-out <i>odjavljivanje</i>	20.0	20.0	30.0	-	70.0
31	Postal charges <i>poštarina</i>					-
32	Transport charges <i>cijene transporta</i>	545.0	195.0	540.0	-	1 280.0
33	Services, material <i>usluge, materijal</i>	20.0	20.0	20.0	18.0	78.0
34	Other services <i>ostale usluge</i>	130.0	80.0	135.0	10.0	355.0
35	Disposal of sewage water <i>otpadne vode</i>	40.0	-	-	-	40.0
36	Bank charges <i>bankovni troškovi</i>	92.0	140.0	32.0	-	264.0
37	Customs duties <i>carina</i>	120.0	15.0	20.0	-	155.0
38	Risk assets <i>imovinski rizik</i>	1 200.0	780.0	1 872.0	-	3 852.0
39	Court tax, skittles <i>sudske pristojbe</i>	17.0	8.0	30.0	40.0	95.0
40	Course variance <i>odstupanje od tijeka proizvodnje</i>	-	-	-	-	-
41	Commission – supply <i>provizija od dobavljača</i>	923.0	36.0	80.0		1 039.0
42	Rental <i>najamnina</i>	-	-	-	-	-
43	Share for guarantee fund <i>jamstvo</i>	37.7	34.8	42.2	11.7	126.4
44	Others <i>ostalo</i>	-	-	-	-	-
45	Commission – sales <i>provizija od prodaje</i>	150.0	80.0	200.0		430.0
46	Material for expedition <i>materijal za otpremu</i>	500.0	400.0	900.0	100.0	1 900.0
47	Administrative expense – comp. <i>administrativni troškovi tvrtke</i>					8 000.0
48	Administrative expense – divis. <i>administrativni troškovi odjela</i>					2 000.0
	<b>Another cost together</b> <i>ostali troškovi, ukupno</i>	<b>13 805.5</b>	<b>4 767.5</b>	<b>11 713.2</b>	<b>641.1</b>	<b>40 927.3</b>
	<b>Together (Slovak kronas - SKK)</b> <i>Sveukupno (slovačke krune – SKK)</i>	<b>41 509.2</b>	<b>44 056.5</b>	<b>63 761.6</b>	<b>8 768.2</b>	<b>168 096</b>

\* Variable character of cost  
promjenjivi troškovi

\*\* Exchange rate 1 EUR = 38.80 SKK (National bank of Slovakia, 31. 12. 2004)

\*\* Valutni tečaj 1 EUR = 38,80 SKK (Nacionalna banka Slovačke, 31. 12. 2004)

ste (minus sales of waste utilization) and then they are divided into production quantity. The results of this progressive grossing up of the variable material costs are shown in Table 2.

This progressive method is shown as a practical example of block processing. It was applied in the

„Glued Laminated Timber Centre” and „Scantlings Centre”. Rotten parts of wood were removed and waste was produced by drying – in the centre “Glued Laminated Timber” only 4 600 m<sup>3</sup> of glued laminated timber was made from the input quantity of scantlings of 9 700 m<sup>3</sup>, with material costs amounting to 54 140 261

**Table 2** Survey of direct material costs of individual centres

**Tablica 2.** Pregled izravnih troškova ulaznih materijala pojedinih odjela

Centre Odjel	Input material costs <i>Ulazni troškovi materijala</i>	Lowered costs by sales of waste utilization <i>Umanjenje troškova prodajom ostataka</i>	Material variable cost for outputs per 1m <sup>3</sup> <i>Promjenjivi materijalni troškovi po m<sup>3</sup> proizvoda</i>
Sawmill Centre <i>Pilana</i>	104 500 000 SKK	6 215 000 SKK	2 580 SKK/m <sup>3</sup>
Scantlings Centre <i>Odjel za izradu elemenata</i>	67 845 026 SKK	7 007 000 SKK	5 581 SKK/m <sup>3</sup>
Glued Laminated Timber Centre <i>Odjel za izradu lamelirane građe</i>	54 140 261 SKK	2 397 000 SKK	11 009 SKK/m <sup>3</sup>

- Exchange rate 1 EUR = 38.80 SKK, 1 USD = 29.49 SKK (National bank of Slovakia, 31. 12. 2004)
- Valutni tečaj 1 EUR = 38,80 SKK, 1 USD = 29,49 SKK (Slovačka nacionalna banka, 31. 12. 2004)

**Table 3** Classification of personal and energy costs to variable and fixed costs

**Tablica 3.** Razvrstavanje troškova osoblja/djelatnika i troškova energije na promjenjive i stalne

Centre Odjel	Sawmill <i>Pilana</i>		Scantlings <i>Piljeni drveni elementi</i>		Glued laminated timber <i>Lijepljena lamelirana građa</i>	
	VC <i>Promjenjivi troškovi</i>	FC <i>Stalni troškovi</i>	VC VT	FC FT	VC VT	FC FT
Item (SKK) <i>stavka (SKK)</i>						
Personal cost <i>troškovi osoblja</i>	9 257 040	4 404 960	14 372 040	2 003 760	15 563 580	4 007 520
Energy costs <i>troškovi energije</i>	7 152 138	145 962	7 925 652	161 748	15 936 466	325 234

**Table 4** Allocation of costs to individual centres (Exchange rate 1 EUR = 38.80 SKK; National bank of Slovakia, 31. 12. 2004)

**Tablica 4.** Pridjeljivanje troškova pojedinačnim odjelima (valutni tečaj 1 EUR = 38,80 SKK; Slovačka nacionalna banka, 31. 12. 2004)

Cost item (SKK) <i>Vrsta troška</i>	Sawmill Centre <i>Pilana</i>	Scantlings Centre <i>Odjel za izradu elemenata</i>	Glued Laminated Timber Centre <i>Odjel za izradu lamelirane građe</i>
VC personal cost <i>promjenjivi trošak osoblja</i>	9 257 040	14 372 040	15 563 580
in0VC energy <i>promjenjivi trošak energije</i>	7 152 138	7 925 652	15 936 466
VC sales (items 32 +46) <i>promjenjivi trošak prodaje (stavke 32+46)</i>	1 045 000	595 000	1 440 000
<b>VC together</b> <i>ukupni promjenjivi troškovi</i>	<b>17 454 178</b>	<b>22 892 692</b>	<b>32 940 046</b>
FC sales (item 45) <i>stalni trošak prodaje (stavka 45)</i>	150 000	80 000	200 000
FC personal <i>stalni trošak osoblja/djelatnika</i>	4 404 960	2 003 760	4 007 520
FC energy <i>stalni trošak energije</i>	145 962	161 748	325 234
Other FC - costs assigned to outputs (items 1,2,3,6,7,36 - 45) <i>ostali stalni troškovi pridijeljeni izlaznim vrijednostima (stavke 1,2,3,6,7,36-45)</i>	9 133 300	15 839 600	18 291 810
<b>Assigned FC together</b> <i>ukupni pridijeljeni stalni troškovi</i>	<b>13 834 222</b>	<b>18 085 108</b>	<b>22 824 564</b>
FC unassigned to outputs (items 15-31, 33-35) <i>stalni troškovi nepridijeljeni izlaznim vrijedno- stima ili proizvodima (stavke 15-31, 33-35)</i>	10 220 800	3 078 700	7 997 000
<b>Together</b> <i>ukupno</i>	<b>41 509 200</b>	<b>44 056 500</b>	<b>63 761 610</b>

Sk (5 581 SKK/m<sup>3</sup> of blocks), and after deducting the sales of waste utilization (sale of sawdust and cleft to other processing divisions), amounting to a total of 51 743 261 SKK. It can be concluded from these figures that material cost for glued laminated timber per production unit is 11 009 SKK/m<sup>3</sup>.

The method of progressive grossing up of material costs has the following structure:

**Sawmill Centre:** *input* – round wood, 1 900 SKK/m<sup>3</sup> (55 000 m<sup>3</sup>) = 104 500 000 SKK

– Sales from waste utilization (6 215 000 SKK) = 98 285 000 SKK

*outputs* - railways sleepers, sawn timber (38 100 m<sup>3</sup>) = 2 580 SKK/m<sup>3</sup>

**Scantlings Centre:** *input* – sawn timber, 2 580 SKK/m<sup>3</sup> (26 300 m<sup>3</sup>) = 67 854 000 SKK

– Sales from waste utilization (7 007 000 SKK) = 60 848 026 SKK

*outputs* - cuts, scantlings (10 900 m<sup>3</sup>) = 5 581 SKK/m<sup>3</sup>

**Glued Laminated Timber:** *input* – scantlings, 5 581 SKK/m<sup>3</sup> (9 700 m<sup>3</sup>) = 54 140 261 SKK

– Sales from waste utilization (2 397 000 SKK) = 51 743 261 SKK

*outputs* - glued laminated timber (4 700 m<sup>3</sup>) = 11 009 SKK/m<sup>3</sup>

## 4.2 Allocation of costs to individual centres and outputs

### 4.2. Raspodjela troškova na pojedinačne odjele i proizvode

In the first place it is necessary to divide costs allocated to each output into assigned and unassigned costs. In collaboration with the company's specialists in specific areas, costs listed in Table 1 could be divided as follows:

*Costs assigned to outputs:*

– items: 1, 2, 3, 8 - 14, 32 and 36 – 45.

*Costs unassigned to outputs:*

– items: 15 - 31, 33 - 35, 47 and 48.

The next step to be taken is to specify variable costs (Table 1 – grey shading, VC) and fixed costs (FC). Personal and energy costs are not fully specified in Table 1. The personal costs are divided according to the number of direct or indirect participants in production. The energy costs are statistically divided according to the consumption of non-productive facilities. Almost 98% of energy is variable indeed and the division itself uses the following classification.

Table 4 has been compiled by use of the following information on costs of each individual centre.

**Table 5** Allocation of costs to outputs of "SAW MILL CENTRE"

**Tablica 5.** Raspodjela troškova prema proizvodima PILANE

Centre <i>Odjel</i>	Saw mill (38 100 m <sup>3</sup> outputs) <i>PILANA (38 100 m<sup>3</sup> proizvoda)</i>				
	Output <i>Proizvod</i>	Sawn timber for sale 9 500 m <sup>3</sup>	Sawn timber -own consumption 26 300 m <sup>3</sup>	Railways sleepers for sale 800 m <sup>3</sup>	Railways sleepers consumption 1 500 m <sup>3</sup>
Cost item (SKK) <i>Stavka troška (SKK)</i>		<i>Piljena građa za prodaju</i>	<i>Piljena građa za vlastitu uporabu</i>	<i>Željeznički prago- vi za prodaju</i>	<i>Željeznički pragovi za vlastitu uporabu</i>
VC personal cost <i>promjenjivi trošak osoblja</i>		2 308 186	6 390 030	194 374	364 450
VC energy <i>promjenjivi trošak energije</i>		1 783 341	4 937 040	150 176	281 580
VC sales <i>promjenjivi trošak prodaje</i>		963 835	0	81 165	0
<b>VC together</b> <i>sveukupni promjenjivi troškovi</i>		<b>5 055 362</b>	<b>11 327 070</b>	<b>425 715</b>	<b>646 031</b>
FC sales <i>stalni trošak prodaje</i>		138 350	0	11 650	0
FC personal <i>stalni trošak osoblja</i>		1 098 350	3 040 694	92 493	173 424
FC energy <i>stalni trošak energije</i>		36 395	100 756	3 065	5 747
Other FC - costs assigned to outputs (items 1,2,3,6,7, 36 - 45) <i>ostali stalni troškovi - troškovi pridijeljeni proizvodima (stavke 1, 2, 3, 6, 7, 36-45)</i>		2 277 332	6 304 614	191 775	359 579
<b>Assigned FC together</b> <i>ukupni pridijeljeni stalni troškovi</i>		<b>3 550 426</b>	<b>9 446 064</b>	<b>298 983</b>	<b>538 749</b>
<b>Together</b> <i>Sveukupno</i>		<b>8 605 788</b>	<b>20 773 134</b>	<b>724 698</b>	<b>1 184 780</b>

**Table 6** Allocation of costs to outputs of “Scantlings centre”

**Tablica 6.** Raspodjela troškova po proizvodima ODJELA ZA IZRADU ELEMENATA

Centre <i>Odjel</i>	Scantlings centre, 10 900 m <sup>3</sup> ODJEL ZA IZRADU ELEMENATA, 10 900 m <sup>3</sup>		
	Output (m <sup>3</sup> ) <i>Proizvod</i>	Scantlings 9 700 m <sup>3</sup> <i>Elementi</i>	Cuts 1 200 m <sup>3</sup> <i>Popruge</i>
Cost item (SKK) <i>vrsta troška</i>			
VC personal cost <i>promjenjivi osobni trošak</i>		12 789 797	1 582 243
VC energy <i>promjenjivi trošak energije</i>		7 053 103	872 549
VC sales <i>promjenjivi trošak prodaje</i>		0	595 000
<b>VC together</b> <i>ukupni promjenjivi troškovi</i>		<b>19 842 900</b>	<b>3 049 792</b>
FC sales <i>stalni troškovi prodaje</i>		0	80 000
FC personal <i>stalni troškovi osoblja</i>		1 783 163	220 597
FC energy <i>stalni troškovi energije</i>		143 941	17 807
Other FC - assigned cost to the Outputs (items 1,2,3,6,7, 36 - 45) <i>ostali stalni troškovi - pridijeljeni trošku proizvoda (stavke 1, 2, 3, 6, 7, 36-40)</i>		14 095 791	1 743 809
<b>Assigned FC together</b> <i>ukupni pridijeljeni stalni troškovi</i>		<b>16 022 894</b>	<b>2 062 214</b>
<b>Together</b> <i>sveukupno</i>		<b>35 865 794</b>	<b>5 112 006</b>

\* Exchange rate 1 EUR = 38,80 SKK, 1 USD = 29,49 SKK (National bank of Slovakia, 31.12.2004)

\* Valutni tečaj 1 EUR = 38,80 SKK, 1 USD = 29,49 SKK (Slovačka nacionalna banka, 31. 12. 2004)

They are divided into the structure of variable and fixed costs and allocated to the centre output.

It is then also possible to allocate the costs of individual centres to their outputs. In case of VC, the value is specified directly and fixed costs are divided into individual outputs according to the relation of each output to the total output of the centre in m<sup>3</sup> (the production value is the scheduling key).

Only one product is manufactured in the „Glued Laminated Timber Centre" – glued laminated timber, and all of its assigned costs (referred to in Table 4) are allocated to this output in the same structure as the above outputs.

## 5 PROPOSAL OF THE SYSTEM FOR ESTABLISHING INTRADEPARTMENTAL PRICES IN A GIVEN COMPANY

### 5. PRIJEDLOG SUSTAVA UTVRĐIVANJA CIJENA MEĐU ODJELIMA ODREĐENE TVRTKE

The establishment of the system has an immediate effect on estimating the centre-profit. This method is based on the structure of the calculation of incomplete (variable) costs along with the calculation of contribution margin (CM) at individual levels. It can have the following form:

**Sales of the centre** (sales of products + intradepartmental output)

Prodaja odjela (*prodaja proizvoda + izlazne vrijednosti među odjelima*)

**Variable costs** (*promjenjivi troškovi*)

= **CM I** (Contribution margin for covering assigned FC and generation of profit)

= *CM1* (*kontribucijska marža za pokriće pridijeljenih stalnih troškova i ostvarenje dobiti*)

**Fixed costs assigned to outputs** (*stalni troškovi pridijeljeni izlaznim vrijednostima*)

= **CM II** (Contribution margin for covering unassigned FC and generation of dobit)

= *CM2* (*kontribucijska marža za pokriće nepridijeljenih stalnih troškova i ostvarenje dobiti*)

**Fixed costs unassigned to outputs** (*stalni troškovi nepridijeljeni izlaznim vrijednostima*)

= **Profit per centre** (Profit/Loss)

= *Dobit po odjelu (dobit/gubitak)*

**Fixed cost unassigned to the centre** (*centers*) (*stalni trošak nepridijeljen odjelu/odjelima*)

= **Profit per company**

= *Dobit po tvrtki*

**Figure 3** Method of profit calculation for the selected centre and company

**Slika 3.** Postupak izračuna dobiti za odabrani odjel i poduzeće



**Table 7** Survey of profit of „SAW MILL CENTRE"

**Tablica 7.** Pregled dobiti PILANE

Centre <i>Odjel</i>	SAW MILL <i>PILANA</i>							
Supplying centre <i>Centar za dobavljanje</i>	Stock <i>zaliha</i>							
Input material <i>Ulazni materijal</i>	Barked round wood 54 200 m <sup>3</sup> <i>okorana oblovina</i>							
Product <i>Proizvod</i>	Sawn timber for sale <i>piljena građa za prodaju</i>		Sawn timber -own consumption <i>piljena građa za vlastitu uporabu</i>		Railways sleepers for sale <i>željeznički pragovi za prodaju</i>		Railways sleepers own consumption <i>željeznički pragovi za vlastitu uporabu</i>	
Quantity <i>Količina</i>	9 500 m <sup>3</sup>		26300 m <sup>3</sup>		800 m <sup>3</sup>		1 500 m <sup>3</sup>	
	Sk/m <sup>3</sup>	Together (SKK) <i>ukupno</i>	Sk/m <sup>3</sup>	Together (SKK) <i>ukupno</i>	Sk/m <sup>3</sup>	Together (SKK) <i>ukupno</i>	Sk/m <sup>3</sup>	Together (SKK) <i>ukupno</i>
Var. intradepart. benefit <i>promjenjivi dohoci pojedinih odjela</i>			3 010	79 172 097			3 010	4 515 519
Fix. intradepart. benefit <i>stalni dohoci pojedinih odjela</i>				9 446 064				538 749
Intradepart. benefit together / sale <i>Dohoci pojedinih odjela, ukupno/prodaja</i>	6 000	57 000 000	3 010	88 618 161	7 000	5 600 000	3 010	5 054 268
-Accounting waste <i>-vrijednost otpada</i>	163	1 549 672	163	4 290 144	163	130 499	163	244 685
VC together <i>ukupni promjenjivi troškovi</i>	3 112	29 562 121	3 010	79 172 097	3 112	2 489 442	3 010	4 515 519
-VC Sale <i>-promjenjivi troškovi prodaje</i>	101	963 835	0	0	101	81 165	0	0
- VC material <i>promjenjivi troškovi materijala</i>	2 743	26 056 430	2 743	72 135 171	2 743	2 194 226	2 743	4 114 173
- VC mat. Calculation <i>kalkulacije promjenjivih troškova materijala</i>	2 580	24 506 759	2 580	67 845 026	2 580	2 063 727	2 580	3 869 488
-VC others <i>-ostali promjenjivi troškovi</i>	431	4 091 527	431	11 327 070	431	344 550	431	646 031
CONTRIBUTION MARGIN <i>kontribucijska marža</i>	2 888	27 437 879	0	9 446 064	3 888	3 110 558	0	538 749
FC assigned TOGETHER <i>pridijeljeni stalni troškovi, UKUPNO</i>		3 550 426		9 446 064		298 983		538 749
- FC sale <i>- stalni troškovi prodaje</i>		138 350				11 650		
- Other assigned FC <i>- ostali pridijeljeni stalni troškovi</i>		3 412 076		9 446 064		287 333		538 749
<b>Output PROFIT</b> <i>Dobit od izlaznih vrijednosti</i>		<b>23 887 453</b>		<b>0</b>		<b>2 811 575</b>		<b>0</b>
Unassigned Fixed Costs <i>Neprijeljeni stalni troškovi</i>	10 220 800							
<b>PROFIT of the centre</b> <i>Dobit odjela</i>	<b>16 478 228</b>							
<b>Take out centre</b> <i>Izlazni odjel</i>			<b>Scantlings centre</b> <i>Odjel za izradu elemenata</i>			<b>Impregnation</b> <i>impregnacija</i>		

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Speaking of methods for the calculation of profit of individual centres and the company as a whole, it is possible to apply the method for estimating the intradepartmental prices of individual outputs in accordance with Alternative 5 (see Figure 1).

Despite some specific disadvantages of this alternative, which determines the intradepartmental price up to the indication of incomplete standard costs of production + block of fixed costs (assigned to outputs), I still recommend this alternative for estimating the in-

**Table 8** Survey of profit of „SCANTLINGS CENTRE"

**Tablica 8.** Pregled dobiti ODJELA ZA IZRADU ELEMENATA

Centre <i>Odjel</i>	SCANTLINGS CENTRE <i>ODJEL ZA IZRADU ELEMENATA</i>			
Supplying centre <i>Odjel za nabavu</i>	Sawmill <i>Pilana</i>			
Input material <i>Ulazni materijal</i>	Sawn timber / 26 300 m <sup>3</sup> <i>ispiljeno drvo / 26 300 m<sup>3</sup></i>			
PRODUCT <i>PROIZVOD</i>	Cuts <i>popruge</i>		Scantlings <i>elementi</i>	
Quantity <i>Količina</i>	1 200 m <sup>3</sup>		9 700 m <sup>3</sup>	
	Sk/m <sup>3</sup>	Together (SKK) <i>ukupno</i>	Sk/m <sup>3</sup>	Together (SKK) <i>ukupno</i>
Var. intradepart. benefit <i>promjenjivi dohodci odjela</i>			8 666	84 063 216
Fix. intradepart. benefit <i>stalni dohoci odjela</i>				24 429 025
Intradep. benefit together / sale <i>ukupni dohoci odjela /prodaja</i>	12 400	14 880 000	9 309	108 492 240
-Accounting waste <i>-vrijednost otpada</i>	643	771 413	643	6 235 587
VC together <i>promjenjivi troškovi ukupno</i>	9 162	11 765 986	9 309	84 063 216
-VC Sale <i>-promjenjivi troškovi prodaje</i>	496	595 000	0	0
-VC material <i>-promjenjivi troškovi materijala</i>	0	0	0	0
- VC mat. calculation <i>kalkulacije promjenjivih troškova materijala</i>	2 046	2 454 792	2 046	19 842 900
- Var. intradepart. expense <i>promjenjivi međuodjelni trošak</i>	7 263	8 716 194	7 263	70 455 903
CONTRIBUTION MARGIN <i>kontribucijska marža</i>	3 238	3 885 427	0	24 429 025
FC assigned TOGETHER <i>ukupni pridijeljeni stalni trošak</i>		3 102 147		24 429 025
-FC sale <i>-stalni trošak prodaje</i>		80 000		0
-Other assigned FC <i>-ostali pridijeljeni stalni troškovi</i>		1 982 214		16 022 894
-Fix. intradepart. Expense <i>-stalni međuodjelni trošak</i>		1 039 934		8 406 130
<b>PROFIT for output</b> <i>Dobit za izlazne vrijednosti</i>		<b>783 280</b>		<b>0</b>
Unassigned Fixed Cost <i>Neprijeljeni stalni trošak</i>		3 078 700		
<b>PROFIT of the centre</b> <i>Dobit odjela</i>				<b>- 2 295 420</b>
Take out centre <i>Izlazni odjel</i>	Glued laminated timber centre <i>Lijepljena laminirana grada</i>			

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\* Valutni tečaj 1 EUR = 38,80 SKK, 1 USD = 29,49 SKK (Slovačka nacionalna banka, 31. 12. 2004)

tradedepartmental price in the given division because of simple cost assignment to outputs.

The item of intradepartmental benefit is specified by the volume of internal or external marketable price

per a production unit (output of 1m<sup>3</sup>). By consistent inputs in the process of the next centre, the internal (intradepartmental) price is determined by Alternative 5. In this case of defining variable costs (cleared of the item

**Table 9** Survey of profit of „GLUED LAMINATED TIMBER“  
**Tablica 9.** Pregled dobiti ODJELA ZA IZRADU LAMELIRANE GRAĐE

<b>Centre</b> <i>Odjel</i>	<b>GLUED LAMINATED TIMBER</b> <i>LJEPLJENA LAMELIRANA GRAĐA</i>	
<b>Supplying centre</b> <i>Odjel za nabavu</i>	<b>Scantlings Centre</b> <i>Odjel za izradu elemenata</i>	
<b>Input material</b> <i>Ulazni materijal</i>	<b>Scantlings / 9 700 m<sup>3</sup></b> <i>elementi / 9 700 m<sup>3</sup></i>	
<b>PRODUCT</b> <i>PROIZVOD</i>	<b>Glued laminated timber</b> <i>lijepljena laminirana građa</i>	
Quantity <i>Količina</i>	4 700 m <sup>3</sup>	
	Sk/m <sup>3</sup>	Together (SKK) <i>ukupno</i>
Var. intradepart. benefit <i>promjenjivi dohodak odjela</i>		
Fix. intradepart. benefit <i>stalni dohodak odjela</i>		
Intradep. benefit together/ sale <i>dohodak odjela, ukupno/ prodaja</i>	39 800	187 060 000
-Accounting waste <i>-vrijednost otpada</i>	510	2 397 000
VC together <i>promjenjivi trošak, ukupno</i>	24 934	117 191 262
-VC Sale <i>-promjenjivi trošak prodaje</i>	306	1 440 000
-VC material <i>-promjenjivi trošak materijala</i>	550	2 585 000
- VC mat. Calculation <i>kalkulacije promjenjivih troškova materijala</i>	6 702	31 500 046
- Var. intradepart. expense <i>promjenjivi izdaci odjela</i>	17 886	84 063 216
<b>CONTRIBUTION MARGIN</b> <i>kontribucijska marža</i>	14 866	69 868 738
FC assigned TOGETHER <i>ukupni stalni trošak</i>		47 253 589
-FC sale <i>-stalni trošak prodaje</i>		200 000
-Other assigned FC <i>-ostali pridijeljeni stalni trošak</i>		22 624 564
-Fix. intradepart. expense <i>-stalni izdaci odjela</i>		24 429 025
<b>PROFIT for output</b> <i>Dobit od prodaje proizvoda</i>		<b>22 615 150</b>
Unassigned Fixed Cost <i>Neprijeljeni stalni trošak</i>	7 997 000	
<b>PROFIT of the centre</b> <i>Dobit odjela</i>		<b>14 618 150</b>

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\* Valutni tečaj 1 EUR = 38,80 SKK, 1 USD = 29,49 SKK (Slovačka nacionalna banka, 31. 12. 2004)

accounting for waste utilization) and value of assigned fixed costs (which are equal to the item of *contribution margin – CM*, Table 4, 5, 6) *intradepartmental benefit (IB)* is determined as the sum of variable costs and the pertaining contribution margin.

The value of the variable intradepartmental benefit can be determined by the count difference and fixed

intradepartmental benefit. Thereafter the alternative is applied for estimating the intradepartmental price up to the indication of *incomplete standard costs of production + block of fixed costs* (assigned to outputs). The intradepartmental price for the output of 1 m<sup>3</sup> can be determined by the level of intradepartmental benefit, which is equal to the sum of the variable intradepar-

mental benefit (the level of variable costs) and fixed intradepartmental benefit (the level of assigned fixed costs).

It is not possible to take account of intradepartmental expenses in the „SAW MILL CENTRE". This centre implements production and accepts no outputs from any other intradepartmental centre. The input of this centre is wooden pole made directly from the material supplied by external suppliers. In other centres the intradepartmental expenses at the level of variable costs of input semi-finished products should be taken into consideration as well as fixed intradepartmental expenses at the level of output assigned fixed costs.

The following Table 8 shows zero values for the items of material costs within income calculation of the „Scantlings Centre". The reason lies in the specification of the production process. In this case the input material is only roughly processed (cutting, reduction, sharpening, etc.) and no other material is introduced in this process.

With “glued laminated timber” products, other material costs of the production process should be taken into consideration as well as with other centres. In this centre the input of glue into the production process accounts for a standard consumption of 550 SKK/m<sup>3</sup>.

Thereafter individual income can be established of specific centres of the selected division and after deducting overhead costs of the administration centre in a given division, total profit of the whole division can be determined as follows:

<b>Profit centre „SAW MILL CENTRE"</b>	
<i>Dobit odjela PILANA</i>	<b>16 478 228 Sk</b>
<b>Profit centre „SCANTLINGS CENTRE"</b>	
<i>Dobit ODJELA ZA IZRADU</i>	
<i>ELEMENATA</i>	<b>- 2 295 420 Sk</b>
<b>Profit centre „GLUED LAMINATED</b>	
<b>TIMBER CENTRE"</b>	
<i>Dobit ODJELA ZA IZRADU</i>	
<i>LAMELIRANE GRAĐE</i>	<b>14 618 150 Sk</b>
<b>Profit of all centres:</b>	
<i>Dobit svih odjela</i>	<b>28 800 958 Sk</b>
<b>Overhead costs of the Administration</b>	
<b>Centre</b>	
<i>Režijski troškovi administrativnih</i>	
<i>odjela</i>	<b>8 768 200 Sk</b>
<b>Division profit</b>	
<i>Profit odjela</i>	<b>20 032 758 Sk</b>

Then, it is possible to continue estimating the total profit of the whole company by summing individual profits of each division and subtracting the value of fixed costs of the company as a whole.

## 6 CONCLUSION

### 6. ZAKLJUČAK

This paper presents the system for establishing intradepartmental prices up to the indication of total incomplete standard costs of production and block of fixed costs. Such a system, besides respecting the peculiarities of transformation process, gives an opportunity of establishing a profit centre as well.

Thus, the profit centres (e.g. production divisions) become absolutely profitable with their own powers for managing and decision-making. And then, it is just up to responsible managers to decide which alternative of intradepartmental prices to apply in their decision-making. It should be noted here that the level of intradepartmental prices is finally often affected by the level of external prices.

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