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# ANALYSIS OF BENT FURNITURE PRODUCTION COSTS



***WOOD PROCESSING AND FURNITURE MANUFACTURING:  
present conditions, opportunities and new challenges***

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# CHARACTERISTICS OF RESEARCH OBJECT



Research object presented in this article is company producing wooden bent furniture that characterized as a company with long production tradition in this branch.

It is state company established in 1913 year which was known under many names but always connected with wooden bent furniture production.

Company analyzed in the article is a production company, specializing in bentwood, skeletal furniture production - classical, carpenter's, upholstery and special furniture (unique clients' orders).

Bentwood and carpenter's furniture are main products of the enterprise, in it above all chairs and furniture from the plywood. Moreover, armchairs, tables and stools are produced in groups of bent and carpenter's furniture (straight lines). The main product group are bent furniture (chairs) that popularized by this company.

Table 1 presents incomes coming from products sale, in the division according to selected groups and percent share in the sale incomes in years 2006-2009.



**Table 1. Products sale structure of enterprise X in the valuable presentation in years 2006 – 2009**

groups of products	2006		2007		2008		I-VI 2009	
	sale value (tys. PLN)	%	sale value (tys. PLN)	%	sale value (tys. PLN)	%	sale value (tys. PLN)	%
bent furniture	39.807,5	<b>49,8</b>	47.904,0	<b>53,3</b>	58.344,2	<b>55,4</b>	34.753,6	<b>58,8</b>
carpenter's furniture	22.608,6	<b>28,3</b>	23.991,8	<b>26,7</b>	28.700,3	<b>27,3</b>	14.749,9	<b>24,9</b>
upholstery furniture	14.503,6	<b>18,1</b>	15,198,0	<b>16,9</b>	15.033,7	<b>14,3</b>	8.189,7	<b>13,8</b>
special furniture	418,8	<b>0,5</b>	382,2	<b>0,4</b>	9.13,1	<b>0,8</b>	215,0	<b>0,4</b>
<b>Sum</b>	<b>77.338,5</b>	<b>96,7</b>	<b>87.476,0</b>	<b>97,3</b>	<b>102.991,3</b>	<b>97,8</b>	<b>57.907,2</b>	<b>97,9</b>

Source: own study based on material of enterprise X.

The object of research analysis (applying Ishikawa diagram) was problem noticed in examined enterprise concerning high level of production costs.

**There are several factors that had influence of analyzed problem (with percent share of this factors):**

**A. Transport costs of raw materials and products (35%)**

- Transport costs of outside means of transport (20%)
- Transport costs of own means of transport (10%)
- Maintenance costs of own transport means (5%)

**B. Costs of storing (10%)**

- Costs of storehouse stequipping (3%)
- Costs of electric energy (6%)
- Costs of the preservation of storehouses (1%)

**C. Machines (20%)**

- Low efficiency (8%)
- Great degree of machines consumption (7%)
- Mismatching of machines number to the volume of production (5%)

**D. Packaging costs (10%)**

- The costs of packaging materials (4%)
- The costs of putting the logo on products (4%)
- Costs for packaging equipment (2%)

**E. Materials (25%)**

- High price of materials (15%)
- Improper quality of materials (8%)
- Malfunctions caused by material transport and storage (2%)

As a result of the analysis of Ishikawa, it can be stated that the reasons that should be restricted, and which have a substantial impact on production costs are: **costs of outside transportation modes** and **high prices of materials**.

**Table 2. Percentage of individual costs in the total production costs in years: 2007 – 2009.**

Number	Cause symbol	Name of cause	percentage contribution of individual costs in the total production costs [%]		
			2007	2008	2009
1.	K1	Costs of outside means of transport	18	22	20
2.	K2	Costs of own means of transport	11	8	12
3.	K3	Maintenance costs of own transport means	7	4	4
4.	K4	Costs of storehouse (3%)	4	3	2
5.	K5	Costs of electric energy (6%)	6	6	6
6.	K6	Costs of the preservation of storehouses	0,5	1,5	1
7.	K7	Low efficiency of machines	8	11	6
8.	K8	Great degree of machines consumption	7	6	8
9.	K9	Mismatching of machines number	6	5	4
10.	K10	to the volume of production	2	5	5
11.	K11	Costs of packaging materials	3	3	5
12.	K12	Costs of putting the logo on products (4%)	1,5	2	2,5
13.	K13	Costs for packaging equipment (2%)	16	10	17
14.	K14	High price of materials (15%)	9	10	5,5
15.	K15	Improper quality of materials (8%)	1	3,5	2
SUM		Malfunctions caused by material transport and storage	100	100	100

Source: own study based on material of enterprise X.

**Causes which may be reduced, and which have a substantial impact on production costs are:**

- **Transport costs of outside means of transport**

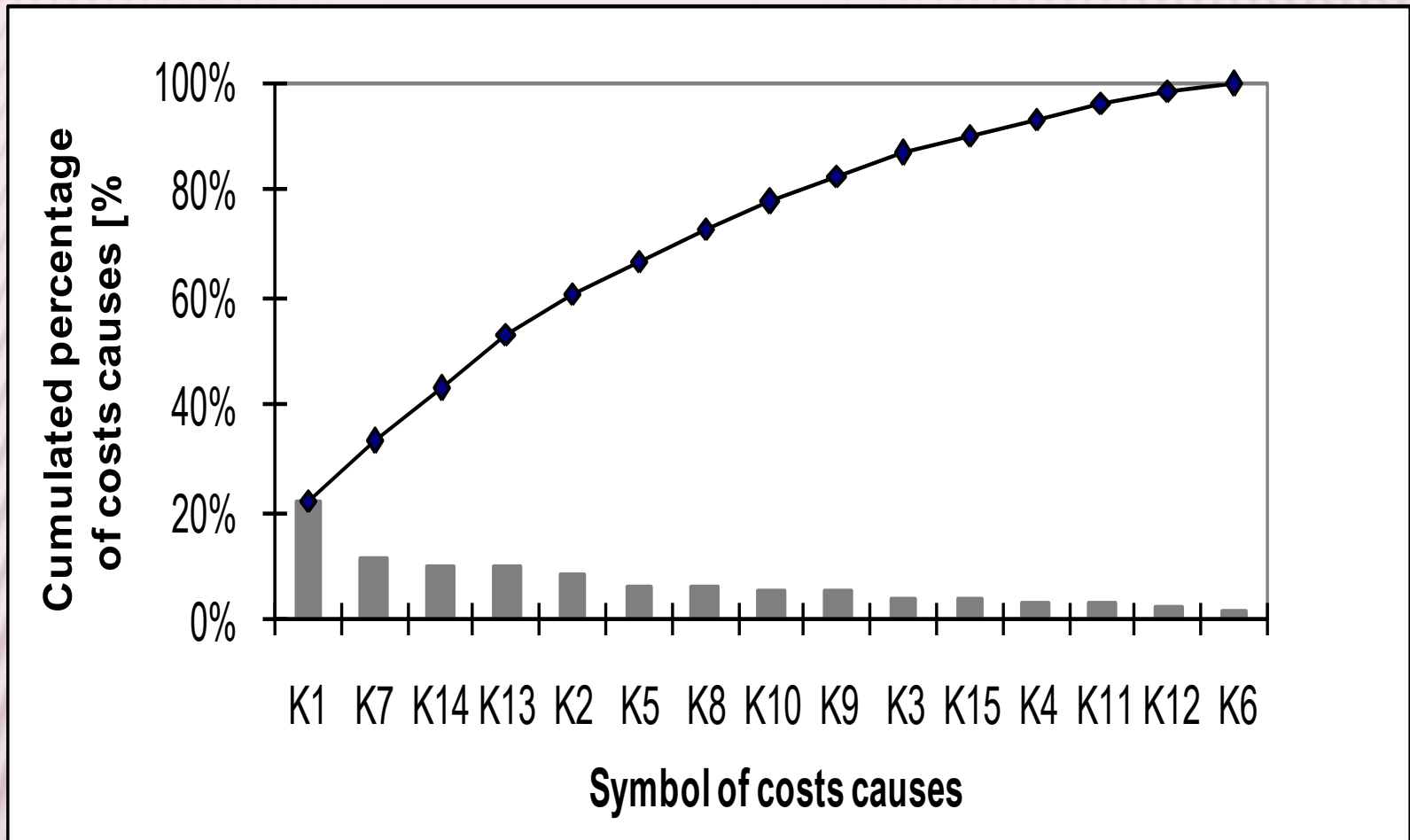
As a solution to this problem, namely to reduce transport costs, it was proposed to increase the base transport, buy vans, that would become independent means of transport (bus companies service). Investments in area of own means of transport would be in the long term more profitable than the use of foreign means of transport.

- **High prices of materials**

To eliminate this problem is proposed to look for other suppliers of materials or more competing strongly for the purchase of lower quality materials (specifically, it is a timber). You could buy the wood wet, it is relatively cheaper and dry them in the warehouse, where there are favorable conditions for this.

In the effect of Pareto-Lorenz diagram it can be stated that causes of high production costs were mainly costs concerning factors so as: (1) outside means of transport, (2) costs of machines maintenance and (3) costs of electric energy and (4) low machines efficiency. Other costs concerned process and equipment of packaging. Graphical results of Pareto analysis were presented on figures 1 and 2 showing data coming from analyzed period: 2008 – 2009.

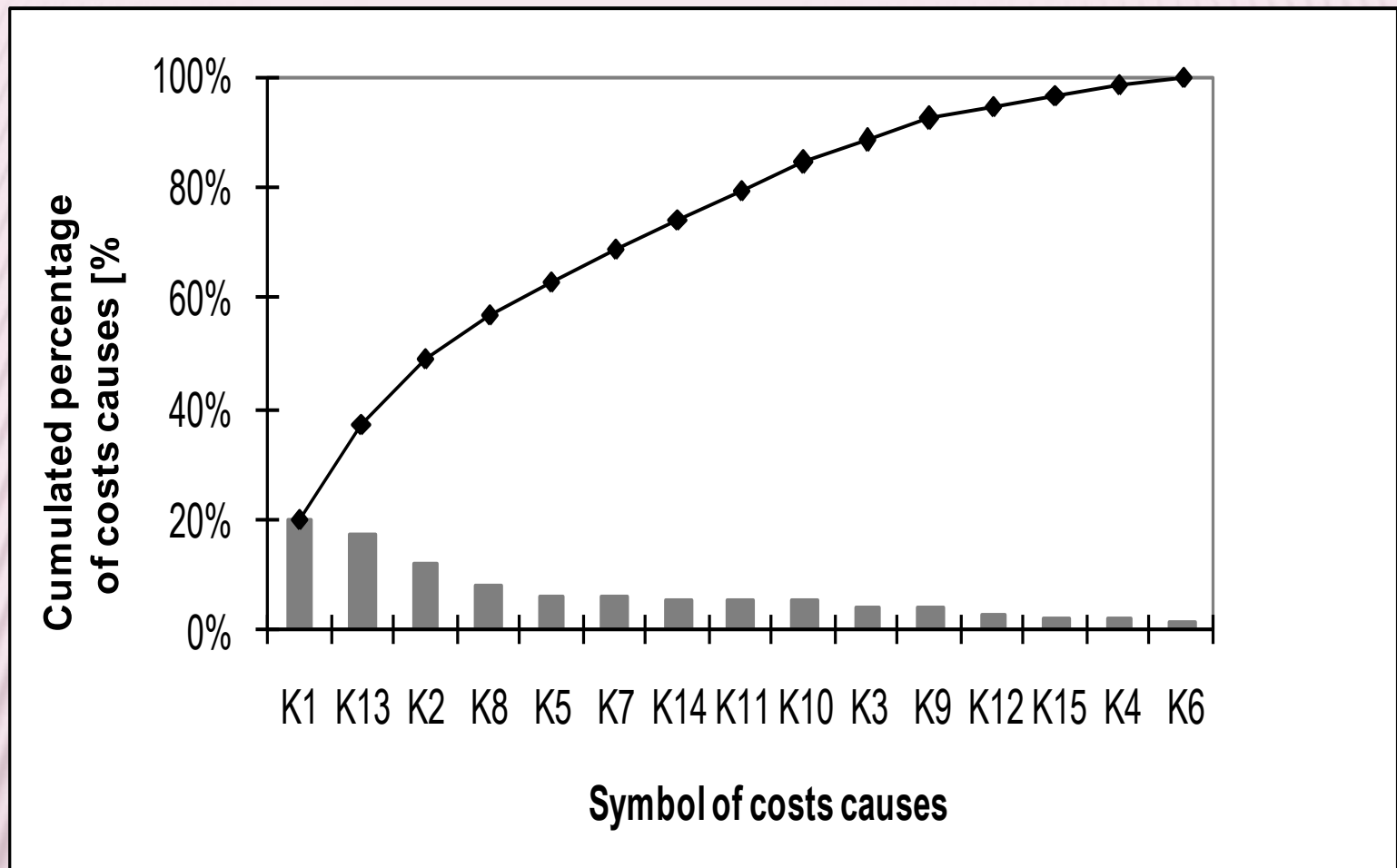




**Figure 1. Pareto – Lorenz diagram for analysis of wooden bent furniture production costs in analyzed enterprises X in 2008.**

Source: own study based on material of enterprise X.





*Figure 2. Pareto – Lorenz diagram for analysis of wooden bent furniture production costs in analyzed enterprises X in 2009.*

Source: own study based on material of enterprise X.

## Results of findings analysis...

An analysis of fig. 3 and fig. 4 shows, that 20% of nonconformities cause average 44% of effects.

In addition, it can be stated that for 44% of all causes of increased costs occurring in the bent furniture production are responsible three reasons, and twelve reasons are responsible for 66% of effects.

The main reasons for increasing costs were:

- costs of outside transport means,
- high price of materials,
- costs of machines maintenance.

**Thank You for attention...**

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