



Waste management in the industry of small and medium sized Turkish furniture enterprises (SMEs)

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Abstract: Urbanization, population growth, rising living standard, the demand for furniture in Turkey, there is a significant increase. In this regard, the sector is fundamentally understands the requirements of the age and development, and in this context re-shaping a new perspective. In this context, as well as the rapid progress of productions in furniture factories that are established due to the need for big businesses based on furniture, it is required to maximize the recycling despite the low level of wastages and wastes. Occurring in the wood products industry waste is not to be underestimated. There are many advantages of wood as a renewable resource. Processed wood residues can be used as secondary raw material for other products. Wood products can be mostly recycled or re-used. Or used products can not be recycled or reused waste incinerated in order to be a source of energy. Furniture enterprises, set up to produce goods. Objectives is to make a profit. As is known, a number of factories producing goods wastage, waste occurs. In this study, the goods producing wastes, discharges to profit by minimizing the factory, how to resolve it, and recycling of waste will be provided investigates how. Survey technique was used in this study. One to one business managers of conducted the survey and face to face interviews. In the survey, about 20 questions directed at businesses of waste, in Turkey cities provinces of random sampling method involving a simple questionnaire was applied to 120 furniture operation. The work of furniture enterprises are still high rates of fire and waste recycling rate of assessment concluded that low-level. In addition, technological developments in the enterprise parallel machines need to be replaced with new ones. Where provided, properly recycling of waste, the plant margin has improved, the damage to the environment goes down to the lowest level. Thus, in the plant ecology of the environment and the world will be preserved.

Keywords: Waste, Furniture industry, Productivity, SMEs, Environment, Wood

1. Introduction

Waste wood can be a potentially valuable resource for the manufacture of various materials and products (Lykidis and Grigoriou, 2008). The type and volume of wastes generated during the manufacture of forest products have changed over time depending on various factors. One of these factors is the reduction in the amount of wood resources available (Lu et al., 2006).

To make a profit in order to meet the needs of individual businesses and economic activities are located to produce goods and services. Businesses are required to use environmental resources due to the activities of creating added value. With outputs produced during the production of goods and services, solid and liquid waste, gaseous waste and hazardous waste occurs. Reduce the amount of waste, prevent the loss of business value of raw materials and reduces operating costs (Kirioglu and Fidan, 2011).

Turkey is a major manufacturer of industrial wood. Forest products industry is a relatively advanced features can be considered. Turkey's forest industry by using their own raw timber, particle board and plywood-based products. Pulp and paper industry, currently working for the domestic market. Unfortunately, significant amounts of wood as fuel is still used (Konukcu, 2001).

Harvested and processing of solid wood material for extraction of logs to the final product consists of all stages of production losses, due to many reasons. This is necessary to minimize wastage as well as the country's economy will benefit greatly from base of business economics (Sofuoglu, 2001).

In the production of timber work, predicted sizes of round wood to work. During this process, next to the wood sawdust, chip, cover, lumberjacks, chock-called waste and scrap of goods occurs. Some of them are, for example, cover boards, the stave is cut hacks evaluated as smaller in size. Others also account for the industry's raw materials, waste or losses are recognized in the timber industry (Ozen, 1978).

Waste in accordance with TS 654, bud timber recycling, timber processing and repair during and outside of class size and features throwaway goods, wood shavings, cover, debris, lumberjacks, wedge part or particle of waste is called. Throwaway goods, specified in standard sizes, but which aren't carried by any of the classes specified in standards in terms of appearance features pieces. Wood shavings, issued by the particles when mowing blade teeth. Crumb, during collection and processing of timber sides and small goods, paquet, there is no possibility lath production piece. Cover, bud is cut out on one side of the timber appraisal stub. Wedge, round or square logs and lumber occurring during the cutting head piece (Fig, 1-2).



Figure 1. Abrasive waste



Figure 2. Chip waste.

Langendorf and his friends are given the following values for the valuation bud timber (Ozen, 1978; Sofuoglu, 2001):

Timber	: % 71
Wood shavings	: % 12
The share of the Authority	: % 4
Evaluated other residues	: % 13
Total	: % 100

Kurz according to the,	
The main product	: % 42
Wood shavings	: % 12
Slab	: % 8
Wedge	: % 3
Firewood	: % 12
By-product	: % 23
Total	: % 100

Ozen 1978; Sofuoglu, 2001 has been determined as 65% of the total timber yield.



Figure 3. Part of waste.

Lumber and veneer mills ends, cover boards, timber production edges of the pieces, chips, sawdust, wood chips and covering some of the main processing waste residues. Although different sizes of these wastes chip board, fiber board, competitive raw materials for pulp and paper sectors. Widely used in most European countries, the source of raw materials (Engur and Kartal, 2002).

Maisenbacher according to 450 the number of factors on yield due to impress wastage rates. These are the most important (Ozen, 1982):

- 1- Intersect method
- 2- Timber cross-section
- 3- Harvested timber edge nature of the
- 4- Diameter of the log
- 5- Log length
- 6- Log form
- 7- Growth characteristics and defects
- 8- Mowers
 - Circular saw
 - Block band saw machine and block multi-bladed machine
 - Vertical multi-bladed machine
 - Combination machines

- 9- Blade Thickness
10- Harvesting errors

Forest products industry polluting substances are divided into four main groups (Engur and Kartal, 2002):

- 1- With or without solids, gases: the best examples of this, sulfur and nitrogen oxides, non-condensable organic gases and sulfur. Most of them, particularly fossil fuels is used, the plant given to the atmosphere through the chimneys.
- 2- Water-soluble substances: these are sodium salts, acids, alkalis, various additives, bark and timber waste substances from the extractives and impregnation. May be toxic or non-toxic.
- 3- Suspended in liquid (suspended) solids: fibers, paper fillers and growing small particles of different actions.
- 4- Solid wastes: tree bark, wood chips, wood shavings, clay and coal ash from water and solutions.

Purpose of The Study: Turkish furniture industry, often working in most of the traditional methods of job shop, has a view dominated by small-scale enterprises. Today, Turkey is in the furniture industry, large and small, with all manufacturers and retail stores with about 60,000 companies and 260 000 people are employed. Process, especially in the last 15-20 years, as well as medium and small-sized enterprises has increased the number of large-scale enterprises. On the other hand, The Union of Chambers and Commodity Exchanges of Turkey capacity reports, according to the number of firms 40 250 or more workers are employed, the number of businesses that employ one hundred or more employees in the 155 (TSI, 2012).

2. Materials and methods

Turkish furniture industry, the market concentration, and/or forest products collected are concentrated in certain regions. Important furniture production areas according to their share of total production in Istanbul, Ankara, Bursa (Inegol), Kayseri, Izmir and Adana are listed as (Spo, 2007).

The primary forest products industry wastes include the timber industry wastes (wood shavings, crumbs, covers, lumberjacks, wedges and discard goods), wastes of wooden panel products, sand, cardboard, packaging wastes, paint, varnish, and water wastes. Reuse of these wastes that are left in the hands of businesses by exposing them to various processes and formation of this cycle have become an economic and political target for both developed and developing countries.

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Survey technique was used in this study. One to one business managers of conducted the survey and face to face interviews. In the survey, about 20 questions directed at businesses of waste, in Turkey cities provinces. Random sampling method involving a simple questionnaire was applied to 120 furniture operation.

3. Findings

The data obtained in the study, the frequency, percentage values were calculated. This statistical package for the evaluation of results using the datas given in Table 1, Table 2, Table 3.

Table 1. Demographic properties of enterprises

	Frequency	Percentage (%)
<u>The number of employees in the enterprise</u>		
0-9	54	45
10-19	3	2.5
20-49	33	27.5
50 or more	30	25
<u>Production type of business</u>		
Discrete manufacturing	66	55
Mass production	54	45
<u>The enterprise workspace</u>		
Kitchen furniture	36	30
Seating furniture	15	12.5
Baby furniture	7	5.8
Bedroom furniture	20	16.7
Children furniture	13	10.8
Others	29	24.2
<u>Do you have a CNC machine in enterprise?</u>		
Yes	84	70
No	36	30
<u>Do you have a dust extraction system in enterprise?</u>		
Yes	93	77.5
No	27	22.5
Total	120	100

Table 2. Assessment of waste wood in enterprises

	Frequency	Percentage (%)
<u>In enterprises chip tailings</u>		
Particle board and MDF sent to factories	27	22.5
Chicken farms sending	12	10
Used as fuel	54	45
Other	27	22.5
<u>In enterprises assessment of waste water</u>		
Using purified varnish and paint shops	18	15
Using purified in WC	18	15
Garden irrigation use	18	15
Other	66	55
<u>In enterprises piece tailings</u>		
Use as firewood	72	60
Decorative furniture making	9	7.5
Finger Joint machine	24	20
Other	15	12.5
<u>Paint waste recycling in enterprises</u>		
Whether the disposal of the relevant organizations	75	62.5
Whether the relevant organizations to ensure the storage of	12	10
Other	33	27.5
<u>In enterprises evaluation of packaging waste</u>		
Nylon waste whether the relevant Organizations destruction of	51	42.5
Whether the relevant organizations cardboard wastes for storage	45	37.5
Other	24	20
<u>In enterprises paper waste recycling</u>		
Whether to provide the recycling of paper mills	68	57
Whether the relevant organizations to ensure the storage of	8	6
Other	44	37
<u>In enterprises varnish waste recycling</u>		
Whether the disposal of the relevant organizations	60	50
Whether the relevant organizations to ensure the storage of	-	-
Other	60	50
<u>In enterprises sanding etc. of waste</u>		
Firewood material	18	15
As waste	90	75
Other	12	10
<u>In enterprises waste and waste rate</u>		
%0-5	15	12.5
%6-9	84	70
%10-14	21	17.5
%15 or more	-	-
Total	120	100

Table 3. Demographic properties of the respondents

	Frequency	Percentage (%)
<u>Educational status of the respondents</u>		
Primary school	21	17.5
High school	60	50
University	39	32.5
<u>Of respondents working in the enterprise</u>		
0-5 years	9	7.5
6-8 years	18	15
9-10 years	12	10
11 or more	91	67.5
<u>Department of the respondents</u>		
Process	70	58
Accounting	10	8
Marketing	12	10
Others	28	24
<u>Years old of the respondents</u>		
21-30	30	25
31-40	50	42
41-50	25	21
51 and more	15	12
<u>Gender of the respondents</u>		
Male	100	83
Female	20	17
Total	120	100

4. Results and discussions

According to this study the majority of level of education is high school level, high school level of individuals, business owners, masters and appear to be the foreman. Furniture factories, administrative and management emphasizes the importance of education at the university level pruning that the majority of people.

In terms of years of working in this sector, the majority of people who fill out the survey 77.5% and over 9 years observed. This shows that the industry experienced people who know the job.

All of the surveyed small to medium-sized enterprises, 45% of production and 55% of batch production. All enterprises engaged in mass production, batch production makers in 32.5% of dust extraction system. Absence due to dust extraction system in the field of discrete manufacturing enterprises to be small or the cost is high. Dust extraction system, a clean environment, the collection of waste easier, as there are many benefits to reduce the possibility of dust. In this context the importance of the system appears to be how big.

The study area outside of the other choices in the poll of businesses, office, bathroom, garden furniture are included. All businesses are working more than one area. More space to cater to more than one area of study so as to increase the size of enterprise and profit.

CNC machines are all medium and large-sized enterprises. The main reason is due to the mass production that makes the CNC benefit from the use of manpower and time, use of less importance. Recycling of waste sawdust, 55% of enterprises, and 45% are considered as firewood. These ratios is given that recovery is still insufficient observed levels.

Waste water back to the work of transformation is carried out by medium-sized enterprises. Varnish and paint shops to meet both environmental and water used in the waste water plant will profit. Garden watering will be environmentally friendly by using the business. There are no studies on the recycling of waste water in small businesses. Small enterprises, water, sewer goes to waste.

Part of the waste timber production enterprises, and the fence are used to make decorative decoration. Some of the parts of waste in the finger joint In enterprises combining machine are made available again. Some enterprises are considered as firewood.

The upper surface processes and solvents used in the paint-varnish is flammable. Upper surface treatment and not as waste disposal businesses prefer to storage. Paint-varnish cans stored for recycling. In addition, environmental officers of all waste in accordance with waste regulations under the supervision of the ministry of the environment are evaluated.

Storage of waste nylon provides businesses by giving the relevant organizations. Other option under the auspices of the ministry of the environment assessed marks the businesses. Cardboard and paper waste sent for recycling the majority of businesses and send their paper mills. Some businesses are marked other option for upholstery use.

Grinding and so on. waste "fuel material (fuel briquettes, etc.) using the" and "waste" using options, sanding, etc. markings reason is the difficulty in collecting waste. "Other" option is the use of the process of the upper surface markings reason for using some of the mixtures.

As a result of the survey 120 and over 15% did not waste any business. This is because over 15% and profits by stopping fire the event that the company can not obtain a huge loss. A rate of 6-9% in the vast majority of enterprises and the waste is waste.

Conclusions

Timber production and the bud of the factors that will minimize wastage rates in accordance with the valuation technique is required. Evaluation of the wood material with a minimum of wastage of raw materials, as well as the need of wood processing enterprises is extremely important for the economy. In order to reduce fire, remains smaller cross-section than the valuation Parts and bud is required with minimal losses. Lumber mills are capable of employees and their work, there should be thorough maintenance of machinery and equipment.

Part of waste recycling work for gain, to some extent cut off parts of the finger joints can be used in combination with the camera so that the desired dimension. Using waste as fuel to heat the factory parts can help.

For recycling of waste wood shavings to gain work, send chipboard factories, poultry farms, sending fuel to use, as using the recycling of cork production can provide. Examined the upbringing of fuel briquettes from chips and mushrooms can be used.

Recycling of waste water cleaning can be achieved. In addition, emerging water waste; garden irrigation varnish and paint shops, toilets can be used. Thus, water saving is achieved in terms of the factory.

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