

STUDY OF TYPES OF DEFECTS IN WOOD CHIPBOARD PRODUCTION

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Annotation: Types of defects in wood chipboard production and losses connected with the defects were studied. Faulty products were studied by statistical methods of control; analysis of causes of faulty products at wood chipboards production was carried out. Economical appraisal of losses according to peculiarities of production was given.

Key words: defect, faulty products, statistical methods of control, wood chipboards.

Introduction

Choice of technical measures allows increasing effectiveness of functioning of wood chipboards production, which is connected with launch of quality and competitive products for broad utility in building, special purpose furniture production, and constructions working in atmospheric conditions [1, 2]. The main purpose of commercial organization is to get a profit [3], provided that one of effective ways of increasing profit is decreasing expenses. Furthermore, expenses need to be identified, evaluated and controlled. Nowadays not all expenses can be decreased, for instance, it is not recommended to decrease expenses on quality materials and salary. However, some part of expenses, which is called losses [4], can and must be decreased for increasing effectiveness of activity, competitiveness, and profitability of an enterprise. Losses are expenses for mismatches; classification of expenses for quality was fully presented in [5]. It is possible to decrease expenses for mismatches by identification of faulty products, analysis of causes of faulty products and exclusion or minimizing their influence. Most enterprises keep a record of characteristics of quality of production in the form of a report of different types of faulty products. This allows evaluating losses from faulty products in monetary equivalent without additional studies. Statistical methods of quality control of production and processes can be effective methods of managing losses [6, 7].

Purpose of the work

The present work aims to show how application of statistical methods can help identify sources of losses in the form of faulty products, analyze their causes at wood chipboards production.

Methods and objects of the study

Technological process of wood chipboard production is a coordination of a lot of stages (fig. 1) which have a possibility of mismatches.



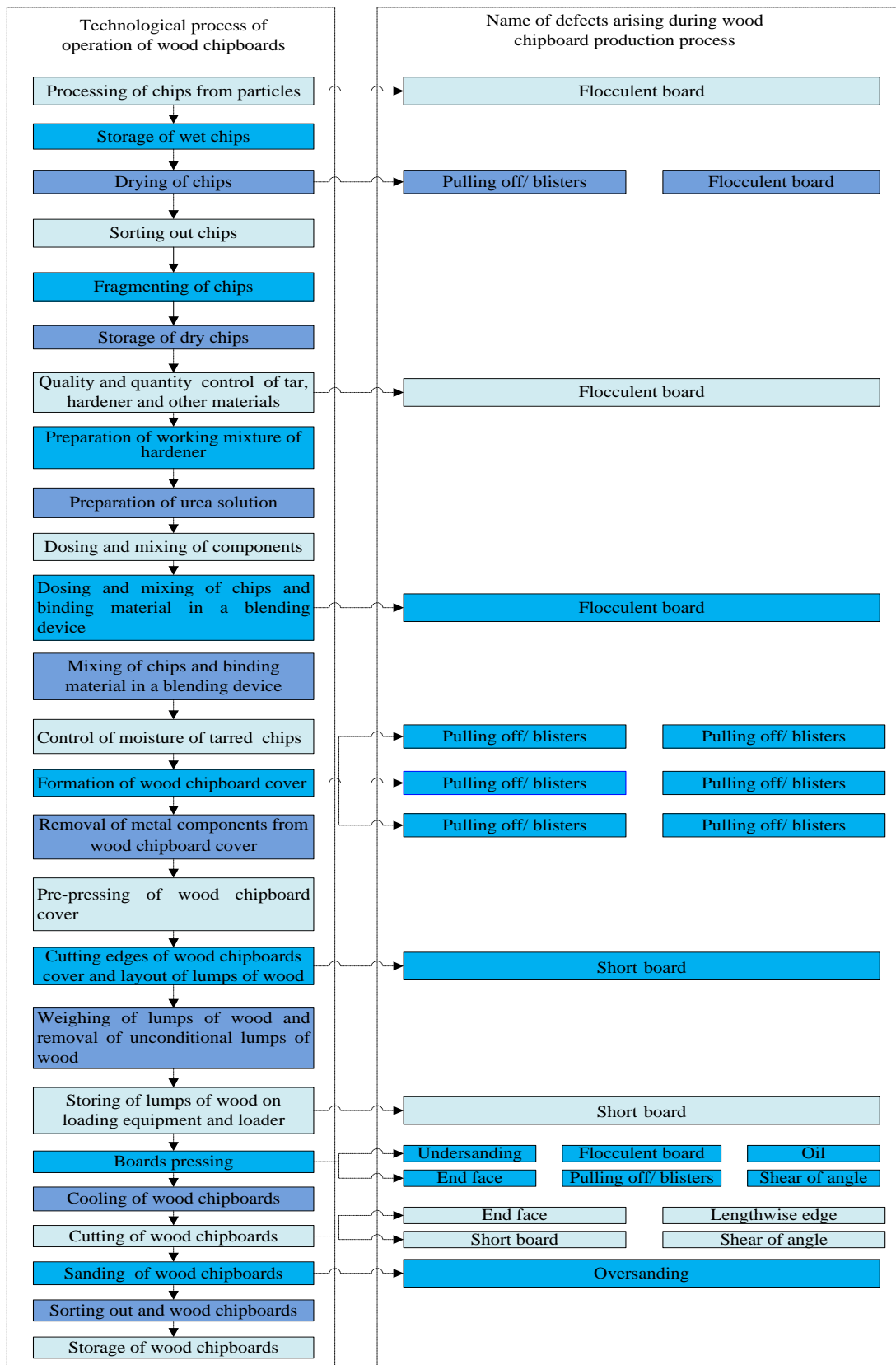


Figure 1. Scheme of a technological wood chipboard production process with stages and types of defects arising on them more often.

To get an overview of the quality of products a share of unconditional products was defined from the whole quantity of wood chipboards launched by a factory. A chart of the p-card type for the share of defective products was made to visualize the results, fig. 2.

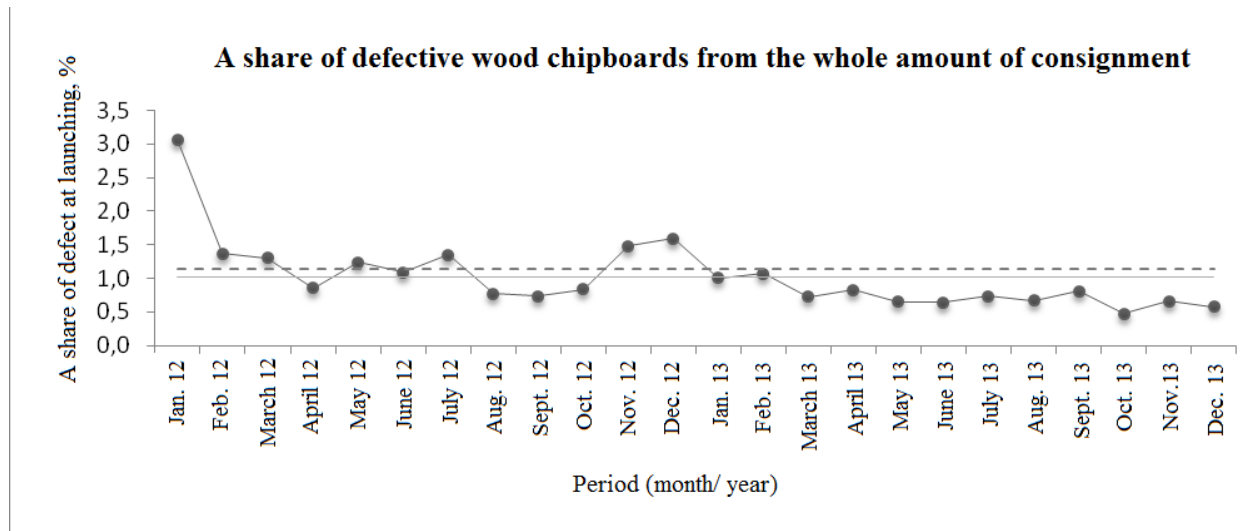


Figure 2. Chart with defective products share.

Charts help in setting periods with high and low level of defectiveness and elicit productive situations which enable best quality of data [4].

On the basis of the chart it was stated that:

- a share of defective products in 2013 decreased in comparison with 2012. The cause of decrease of level of defectiveness could not be identified which was connected with a large period of time passed since the changes in the process;
- a process of wood chipboards production in 2013 became stable;
- a share of defectiveness at an enterprise is very low. It was on the average less than 1 % in 2013.

Financial losses of an enterprise for 2012-2013 were defined for to detect losses from defectiveness in monetary equivalent (in RUB.). Types of defects revealed during wood chipboards production and fixed monthly in a quality control department in reports of defectiveness registration were detected for this reason. They are: sanding defects; dust and tar pitch; end face; lengthwise edge; pulling off; shear of angle; short and flocculent board; oil. Ways of use of wood chipboards in dependence on the type of a defect were identified. Prices of wood chipboards having a defect were set. Losses connected with the launch of a defect made 13,8835 mln. RUB.

Results

Analysis of frequency of defects by means of their names with the help of the diagram [5], fig. 3, was completed.

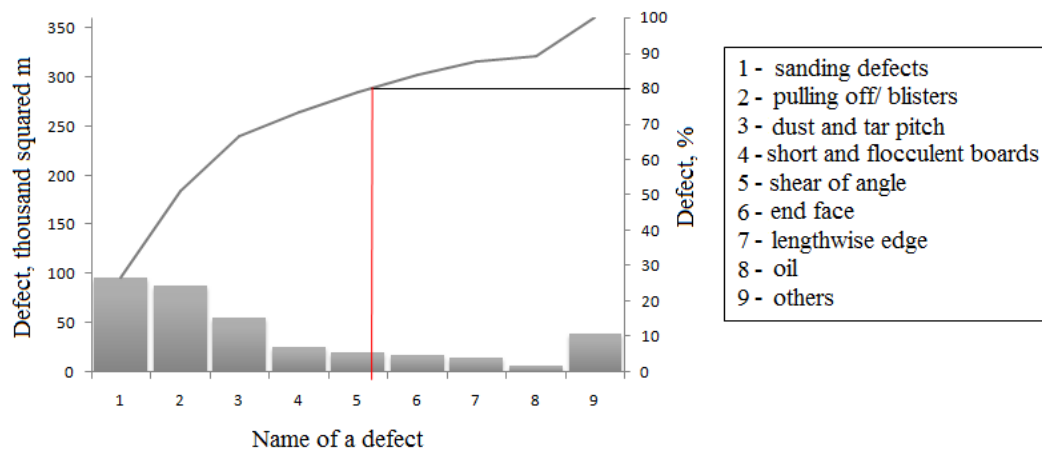


Figure 3. Frequency of defects of wood chipboards by means of their names.

The diagram shows the most frequent defects: sanding defects, pulling off/ blisters, dust and tar pitch, short and flocculent boards.

Having drawn an analogy between the diagram and financial losses because of defects of launch a conclusion can be made about small losses for an enterprise in case of a ‘short and flocculent boards’ defect.

A ‘short and flocculent boards’ defect at an enterprise is registered as one type of the defect. In reality these are two types of defects – ‘flocculent boards’ and ‘short boards’.

The main reasons of ‘flocculent boards’ defect are defined as: high moisture of dry chips; incorrect mode of tarring; low quality of tar, insufficient pressure on the press; small weight of cover; short cycle of pressing; low temperature of pressing; incorrect reduce of pressure.

Most reasons of defects are connected with operator or technologist faults because of insufficient experience.

The diagram in fig. 4 was made for detecting operations of technological production process of wood chipboards where a lot of defects take place (80 %).

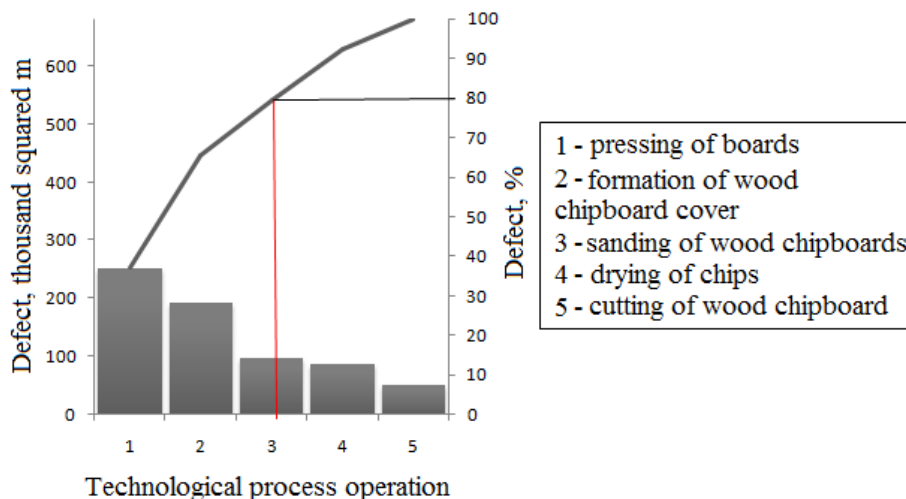


Figure 4. Diagram of detection of operations of technological production process of wood chipboards where a lot of defects take place.

As it can be seen from fig. 4, most defective boards take place at the stage of pressing of boards and formation of wood chipboard cover. Therefore, these operations were described in detail by means of

diagrams in fig. 5 and fig. 6, where quantity proportion of types of defects in these operations is shown.

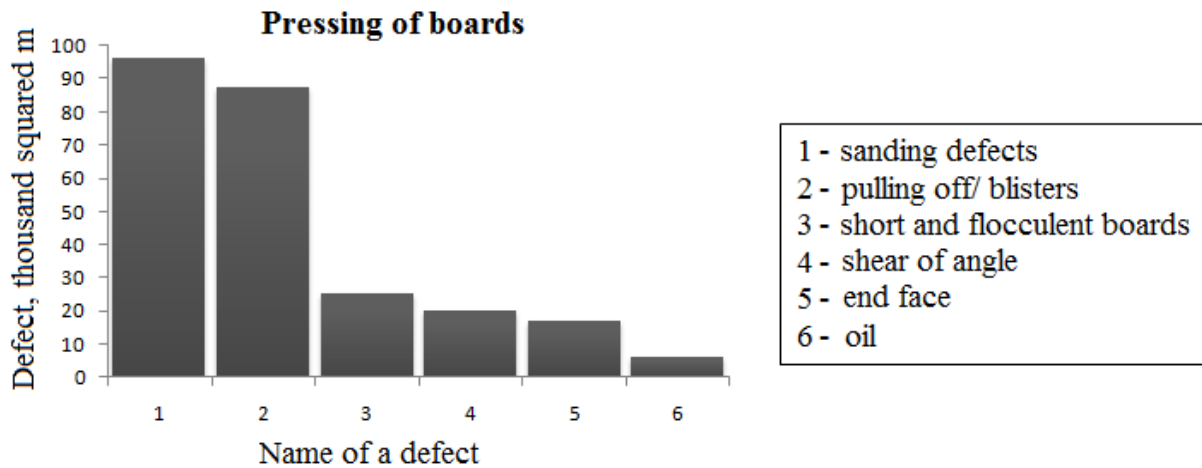


Figure 5. Types of defects at the stage of pressing of boards.

Sanding defects and ‘pulling off/ blisters’ defects take place more often at the stage of pressing boards, the least quantity refers to ‘oil’ defects.

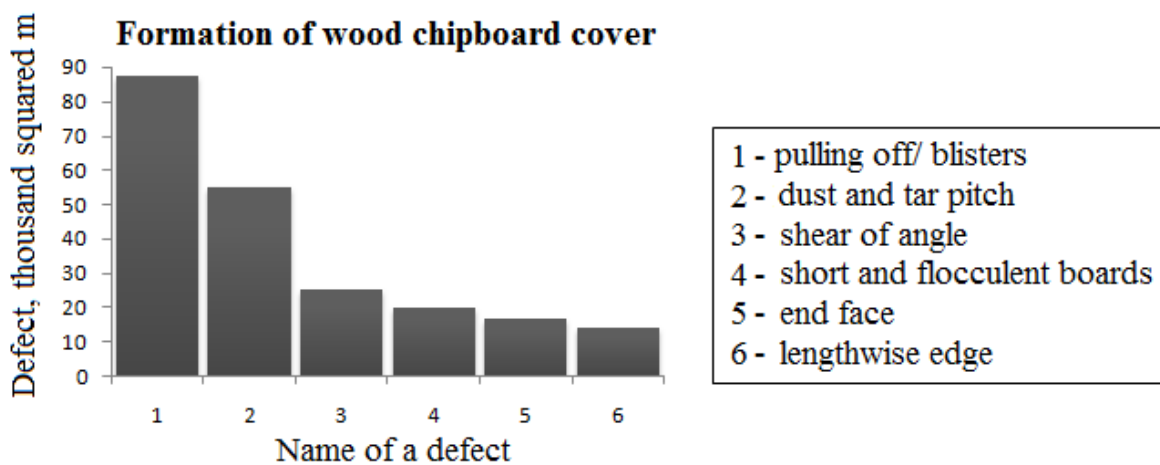


Figure 6. Types of defects at the stage of formation of wood chipboard cover.

‘Pulling off/ blisters’ defects take place at the stage of formation of wood chipboard cover more often, ‘lengthwise edge’ defects take place less.

Charts of individual data and moving range towards every type of the detected defect were made for detection of variations of production process of wood chipboard launch. The chart of sanding defects was presented in fig. 7 as an example.

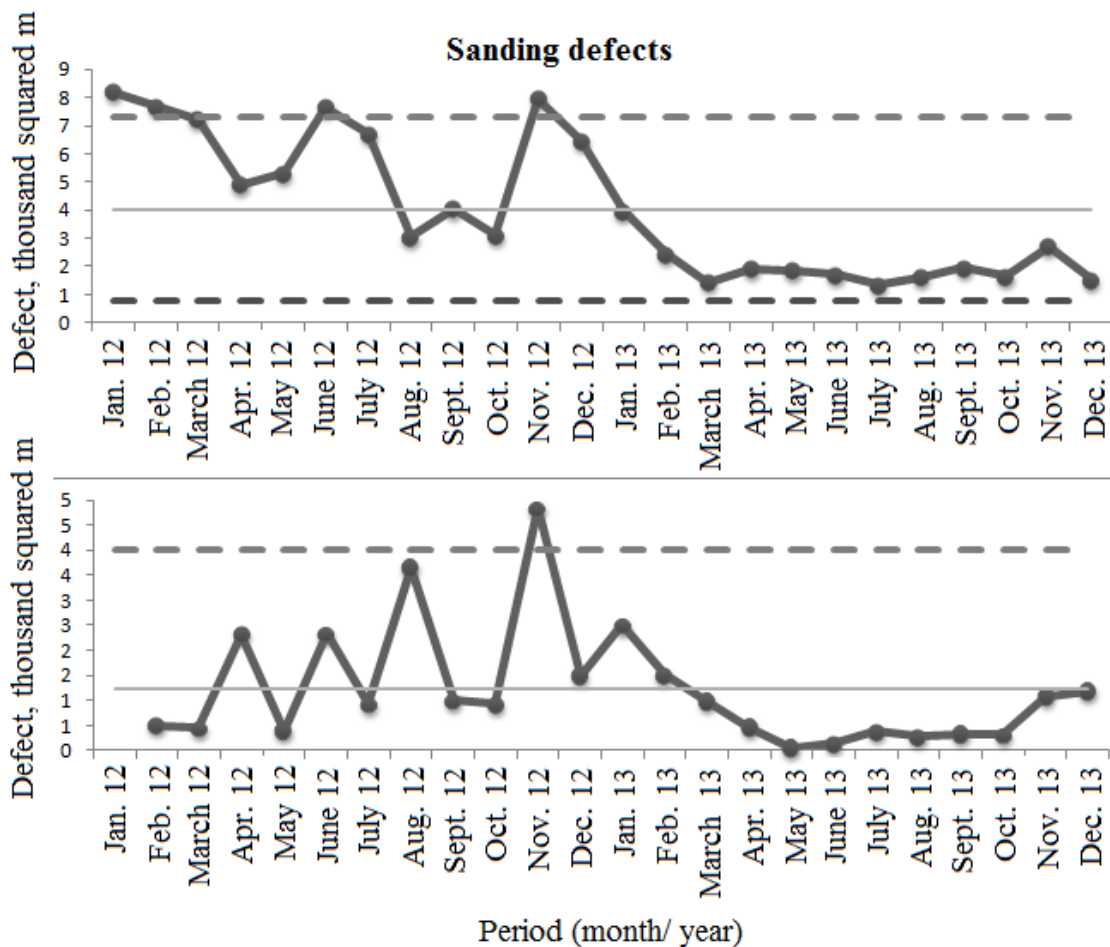


Figure 7. Chart of sanding defects.

The upper chart depicts a number of wood chipboards with sanding defects. The lower chart shows how data of quantity of defective boards change in relation to the previous or next period.

The chart demonstrates instability of production process of launch of boards with sanding defects in 2012. The process has a statistically controlled (stable) character in 2013.

Conclusion

Thus, the use of statistical methods allowed detecting neck stages and defining priorities for quality improvement. Frequent types of defects which cause a lot of monetary losses at enterprises were defined and their causes analyzed. Technological operations with a lot of defects and their types were defined. It should be noted that such kind of analysis was not carried out earlier. The sum of losses caused by defective details was calculated; it comprises about 1 % or a share of 1 % from the whole volume of the ready-made production. However, as a rule the sum of losses in monetary equivalent caused by faulty products attracts attention of managers to the quality of products.

A conclusion about the necessity of further study of factors of technological process which influence the parameters of quality of wood chipboards was made on the basis of the study for reasonable fixation of their optimal data in normative and technical documentation.

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