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STATISTICAL QUALITY CONTROL IN FOREST PRODUCT INDUSTRY: A CASE STUDY

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Introduction

In the economic system that mostly depends on rivalry, the management has to develop the quality of the goods and service continuously. High quality production is so much beneficial for the productivity, the pleasure of doing the job in the best way, acquired time by doing the job once accurately.

The globalization of the industry has changed the behavior for the consumers. The quality of the good is much more important than in which country it is produced. This rapid change in market forced the producers to adapt to the specific quality & standards of ISO (International Standard Organization).

Some techniques have been used in quality control to provide the consumers' quality demands. The most common of them are sampling plans.

In this study, single and double sampling plans and a sample statistical quality control application was done at the parquet unit of Ardesen Timber Plant.

A computer program (by using Delphi v3.0) was coded for the application. The data provided in this study were given as input and assessment was done according to the outcomes. As material parquets were selected that have been produced in Ardesen Timber Plant. Ardesen Timber Plant produces timber and parquet in Ardesen, Rize. Annual timber production capacity is 30.000 m^3 and also 50.000 m parquet. During the process at first parquet drafts are prepared after that they are dried to the moisture content kiln dry. After drying process parquet drafts are processed in the tonguing and grooving machine packaged and they are ready to put up for sale. For the study at first, parquet (30 days-a hundred items for each day) was selected at random. And the samples were subject to total (100%) inspection. The result in this period is as follows; 4 days-1 defected item, 9 days-2 defected items, 12 days-3 defected items, 3 days-4 defected items and 2 days-5 defected items. According to the results, the permitted defected item number for Single Sampling Plan (SSP); c=3, the permitted defected item numbers for Double Sampling Plan (DSP); (ci=3, C2=5) was accepted.

Then by using single and double sampling, the quality control was done. This was achieved by following steps and formulas in the chart below. At the same time Operating Characteristics (OC), Average Outgoing Quality (AOQ), Average Sample Size (ASS) and Average Total Inspection (ATI) curve were drawn. Binom, Hipergeometric and Poisson distributions are used in the single and double sampling plans. These distributions are likely for the results. Here, for the application convenience Poisson distribution is selected during the preparation of the computer program. As known, Poisson distribution is formulated as follows;

N : Main group, n : Sample group, d : The number of defected items of the sample N. Main group, n_1 : First sample group, n_2 : Second sample group, d_1 : The number of defected items of the first sample group, C_1 : Permitted defected item number, d_2 : The number of defected items of the second sample group, c_2: Permitted defected item number;

	Operating Characteristics	Average Outgoing Quality	Average Sample Size	Average Total Inspection
Single	Pa(p')	p'xPa(p')	n	Pa(p')xn+(l-Pa(p')xN)
Double	Pa(p')	p'xPa(p')	n_1+n_2 x P(2.sample)	ASS+(N-ni)xP(d>ci)+(N-ni-n2)x(l-Pa(p')-P(d>C2))

Results and Evaluation

In order to meet the need of finding four different curves for SSP and DSP, a program was created using Delphi. For the selected N=1000, n=100, c=3 plan, when what quality of parties with the probability of being accepted and/or rejected is observed (this plan is suppose to be sifter nature), according to the plan since the permitted defected item number is c=3 on n=100 sample and for the total P probability low, the probability of the acceptance of the incoming N=1000 is to be P=Po+Pi+P2+P3. Here for the n=l00 itemized sample group, PO shows the probability of not having any defected parquets (d=0), PI is for d=l, P2 for d=2 and finally P3 for d=3. Probabilities varies according to the rate of P defected items in the delivered party.

When the prepared program is started up, the plan, which is going to be applied first, has to be selected from the main menu (SSP and DSP). After the selection of the plan in SSP, N=1000 (main group), n=100 (sample group), and c=3 (permitted defected item number) and also in DSP, N=1000, ni=100, n;=150, Ci=3 and c;=5 values are input.

As the program is started up and the data for SSP is input, the values of OC, AOQ ASS and ATI are found for different p' values. After that in every situation the graphics

with regard of these values are drawn with the help of function keys (F2=OC, F3=AOQ, F4=ASS, F5=ATI).

As seen in graphic 1 for p'=0.01, the probability of acceptability of parquets in Ardesen Timber Plant is Pa(p')=0.981. The accepted probabilities for p' values are given under the graphics. According to graphic 2, Average Outgoing Quality Limit (AOQL) for parquets is p'=0.03 and AOQ is found as 0.019. For SSP, ASS is constant and is equal to 100 (See graphic 3). Graphic 4 shows the (p') of ATI number change due to party qualities. At the beginning as ATI curve raises at a low-pace, it shows a high-pace from p'=0.02 to 0.06 and after that until 1000 a low-pace.

As the program is started up and the data for DSP is input, the values of OC, AOQ, ASS and ATI are found for different p' values. After that in every situation the graphics with regard of these values are drawn with the help of function keys (F2=OC, F3=AOQ, F4=ASS, F5=ATI).

As seen in graphic 5 for p'=0.01, the probability of acceptability of parquets is Pa(p')=0.990. The accepted probabilities for p' values are given under the graphics. According to graphic 6, Average Outgoing Quality Limit (AOQL) for parquets is p'=0.026 and AOQ is found as 0.020. For DSP, ASS is maximum (=153) for p'=0.04 and 0.05 (See graphic 7). Graphic 8 shows the (p') of ATI number change due to party qualities. At the beginning as ATI curve raises at a low-pace, it shows a high-pace from p'=0.02 to 0.07 and after that until 1000 a low-pace.

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THE EFFECT OFMOLIBDEN AND 6-BENZILAMINOPURIN IN NACI MEDIUM ON THE ACTIVITY OF VIGNA SINENSIS NITRATE REDUCTASE ENZYME

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Introduction:

One of the problems for researchers in agricultural studies in these days and near future, is to reduce the cost of manuring by nitrogen fertilizers without any decrease in agricultural rates The increase in the cost of fertilizers and also the aim of minimizing environmental pollution forces people to use mineral fertilizers in a more rational path-

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