

Chapter 6

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AN IMPORTANCE OF THE ROOF OF THE TOYOTA HOUSE FACTORS FOR SAFETY BELTS STRIKER PRODUCTION

Abstract: In the chapter was introduced the enterprise producing safety belts striker Areas generating problems were identified. An analysis of results was obtained on the base of the BOST questionnaire survey and it was made a statistical analysis concerning elements roof of the Toyota house.

Key words: BOST, Toyota's principles, improvement, safety belts.

6.1. An identification of areas generating the problem

Safety belts striker is elements of the seat belts system. Problems in a production process are connected with many factors. They often result from errors during the production of the element. Visual errors are caused by splinters ensuing during the production. To eliminate them one should again sharpen the stamp, or exchange to new. it should be again sharpen the stamp, or exchange on new. Often happen some problems with bending. They are caused by problems with getting the appropriate angle of the bending. It is possible to eliminate them through the regulation of stamps bending by the mechanic, e.g. with the help of pads. This error is being regulated by the operator on the machine (press) and often requires also an exchange of the stamp. The stoppages connected with matrix displacement are possible to prevent them by increasing diameters of the

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stamp and changing material and reducing clearance of the matrix. Damage of the head is a big problem. It is happening as a result of the wear and tear of the core of the matrix. In the purpose of eliminating this problem it should be used different material of the stamp and hardened fixing plate. Often happens deadlocks of material resulting from clearance of the matrix and its exaggerated natural consumption. A considerable problem is an error with head crash. In the purpose of eliminating this problem it should be used different stamp and hardened backing plate. Arising problems most often result from errors of the shape and stamping. A different kind of problems are resulting from errors of raw materials what cause problems with tensile strength. (BORKOWSKI S., KNOP K., PLUTA M. 2011).

6.2. Research method and BOSTsurvey results

6.2.1. Characteristics of questions and answers on it

BOST is the survey, where questions are matched to judge enterprise and its immaterial stores are possible on the base of 14 Toyota principles (BORKOWSKI S. 2012a). In the chapter was made a results analysis of the reply question referring to the roof of the Toyota house (mission of the enterprise). Workers answered a question: „What elements are the most important in the realization of production process?”. Fill in the blanks with 1; 2; 3; 4; 5 (5 the most important factor) (BORKOWSKI S. 2012b).

JA		Quality
KO		Costs
CR		Lead time
BP		Work safety
MZ		Staff's morale

Table 6.1 contains a numerical combination of assessments of the factors importance for the roof of the Toyota house.

Table 6.1. Roof of the Toyota house. Numerical combination of the factors' importance evaluation for E1 area. It concerns the enterprise producing safety belts striker

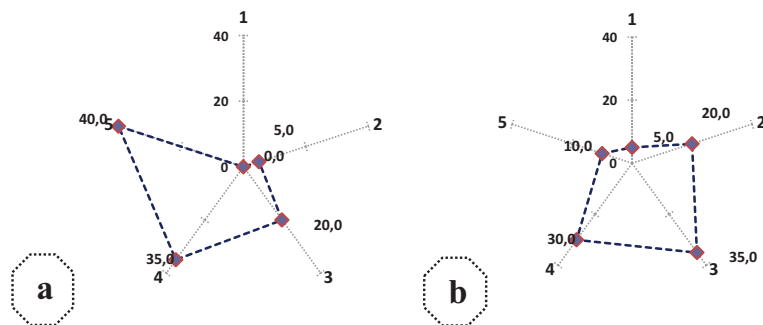
Evaluation	Indicating the factor				
	JA	KO	CR	BP	MZ
1	0	1	6	3	10
2	1	4	4	8	3
3	4	7	4	1	4
4	7	6	4	2	1

Source: own study

From Table 6.1 it results that for the worker of the enterprise thinks that the *quality* (JA) and *work safety* (BP) as the most important elements.

6.2.2. Structure of factors importance determining the mission of the enterprise

Fig. 6.1 is presenting radar graphs made for evaluations of importance the research factors(BORKOWSKI S. 2012c).



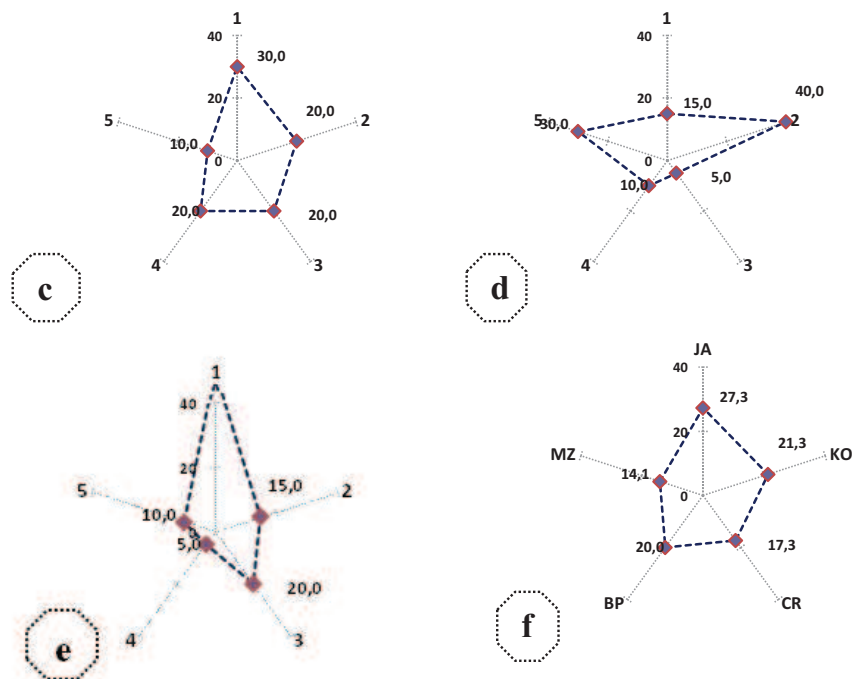


Fig. 6.1. Elements of the roof of the Toyota house. Circle graphs – structure of evaluations for: a) JA, b) KO, c) CR, d) BP, e) MZ, f) average. It concerns the enterprise producing safety belts striker.

Source: own study

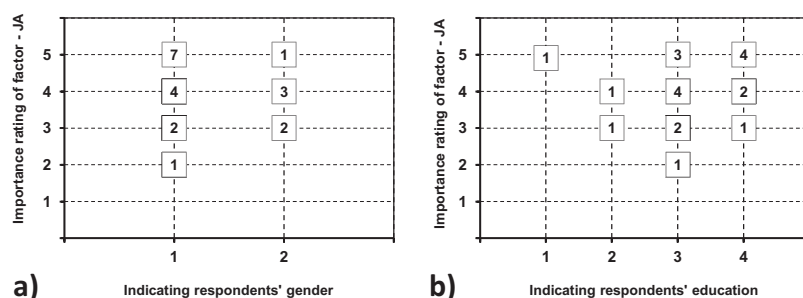
On the basis of carried out analysis it was state, that *quality* (JA) is the most important factor for 40% respondents (BORKOWSKI S., KNOP K., BARTCZAK M. 2011). *Costs* (KO), *lead time* (CR), as well as *staff's morale* (MZ) are the most important only for 10% respondents. 30% respondents recognised as the most important *work safety* (BP). From Fig. 6.1f results that in the enterprise a *quality*(JA) is the most important element 27.3%. Costs (KO) were on a next place 21.3%, *work safety* (BP) 20%, farther *lead time* (CR) 17.3%. *Staff's morale* (MZ) turned out to be the least crucial factor (MZ) 14.1%.

6.3. An influence of respondents features on maps topography of the evaluations number

6.3.1. Maps topography of the number of evaluation for factor quality (JA)

The next stage of results analysis includes interpretation of graphs for voices distribution. Fig. 6.2 is presenting interpretation of evaluation for the factor *quality* (JA) depending on individual features of the respondent (BORKOWSKI S., MIELCZAREK K., BARTELEWSKA A. 2011).

Analysing the graph of the evaluation of the importance the factor *quality* (JA) depending on the respondent gender we notice that the most of men (7) granted this factor the evaluation "5" and one woman granted the same evaluation. Women the most granted the evaluation "4" (3 voices). Analysing the respondents' education it is possible to state, that persons with the higher education on "5" gave 4 votes, on "4" 2 voices. Persons with the secondary education gave the most votes on "4" (4), next 3 voices on "5" and 2 voices on "3". The worker with the primary education voted on "5".



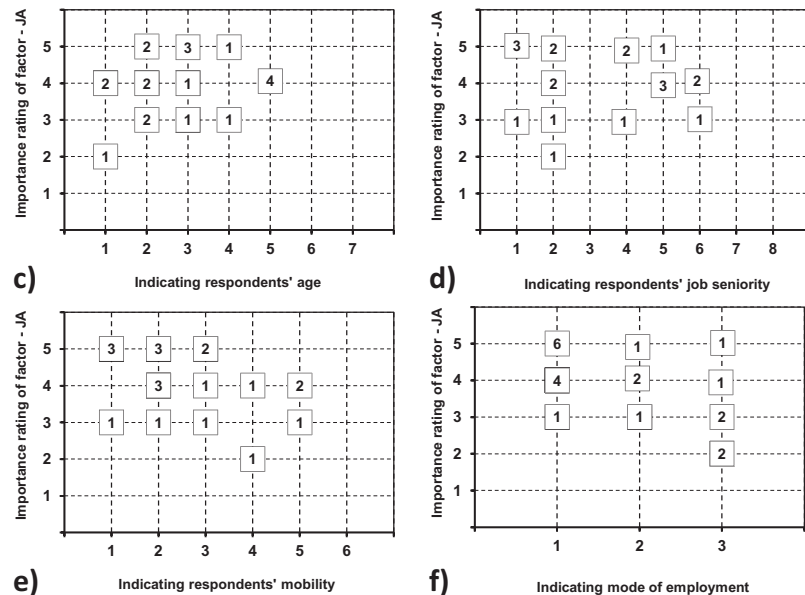


Fig. 6.2. Roof of the Toyota house. The map of evaluation number for JA factors depending on the respondents feature: a) gender, b) education, c) age, d) job seniority, e) mobility, f) mode of the employment. It concerns the enterprise producing safety belts striker.

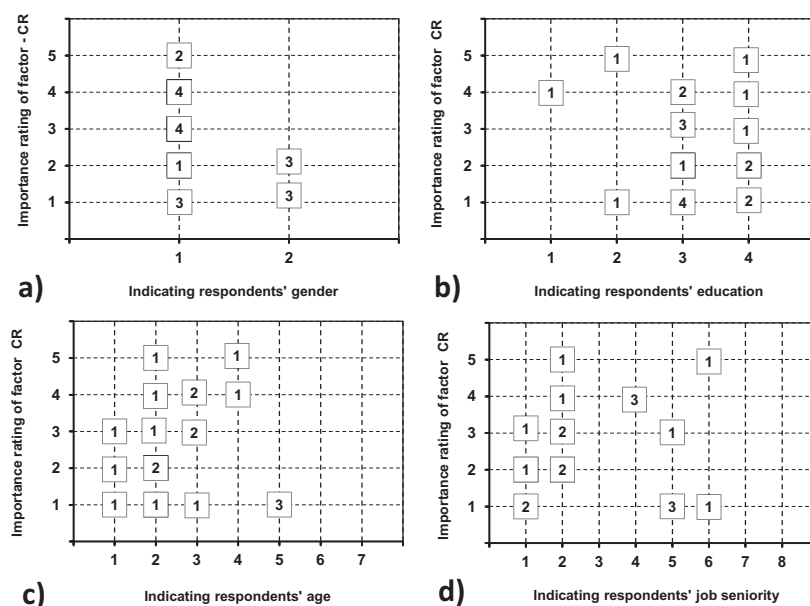
Source: own study

Analysing replies from the work experience point of view of, the most often been a granted assessment "5" from persons with work experience 1-5 years and "4" from persons with work experience 26-30 years. The lowest evaluation for factor *quality* (JA) granted 3 persons which researched enterprise is the first place of employment and for three persons it is second place of employment, as well as 2 persons, for whom the examined enterprise is the second place of employment and 3 persons for whom it is the third place of employment. Considering the mode of employment six workers chose "5". Four workers chose "4" amongst workers employed in the normal mode. Employed workers on the transfer judged the *quality* (JA) on the level "4". Amongst persons employ for the

sake of better financial circumstances most of them chose "3". On the basis of this analysis we can state, that factor *quality* (JA) in the case of seat belts striker is an essential factor (BORKOWSKI S., ROSAK-SZYROCKA J. 2011).

6.3.2. Maps topography of the number of evaluation for factor lead time (CR)

Fig. 6.3 is presenting results of analysis for the factor *lead time* (CR) depending on respondents features (JAGUSIAK M., KONSTANCIAK M. 2009).



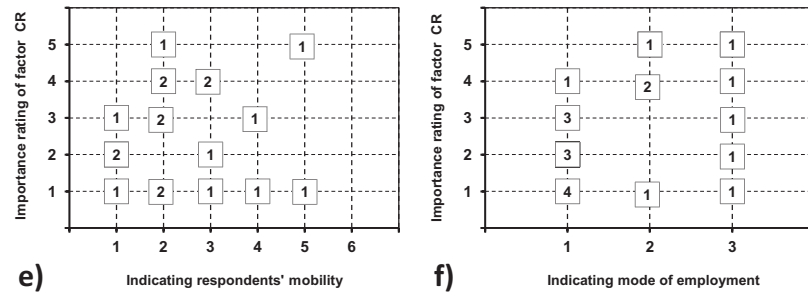


Fig. 6.3. Roof of the Toyota house. E1 area. The map of evaluation number for BP factors depending on the respondents feature: a) gender, b) education, c) age, d) job seniority, e) mobility, f) mode of the employment. It concerns the enterprise producing safety belts striker.

Source: own study

Evaluation "3" and "4" admitted 4 men, evaluation "1" admitted 3 men and 2 evaluation "5". For 3 women the evaluation "1" and "2" was given. The highest evaluations for the *lead time* (CR) gave one person with the vocational school and higher education. 3 persons with the secondary education gave the evaluation "3" and 4 evaluation "1". Amongst persons with the higher education two persons gave the evaluation "1" and "2" and one person every remaining evaluations. Analysing the reply under the point of view respondents age all in 51-55 years gave "1". Amongst persons in age 36-45 years two of them gave the evaluation "4" and two "3". Amongst persons in age 26-35 two of them gave evaluation "2" and each one remaining evaluations.

For employee with job seniority 6-15 years granted the evaluation "2" and "3". All employee with job seniority 21-25 years granted evaluation "4". Three workers with job seniority 26-30 years granted the evaluation "1", and 2 with work experience 1-5 years evaluation "1". Amongst employing workers, for whom the researched enterprise is a second work place two votes on "4", "3" and "1", and one worker recognised the *lead time* (CR) factor as most important. 50% persons, for whom this is third

place of employment was given the evaluation "4", and the rest of them "1" and "2".

Amongst persons that got a job in the normal mode the most (4 persons) voted to the evaluation "1" and for 3 persons on "3" and "2" and one person on "4". Two employed persons on the transfer moving gave the evaluation "4" and one "5" and "1". Amongst persons employ for the sake of better financial circumstances every of evaluations got one voice.

6.4. Summary

How results from the BOST questionnaire survey, that factor *quality* (JA) is the most important in the enterprise producing seat belts striker and the least important there is a factor *staff's morale* (MZ). Factor *quality* (JA) a little more often has been judged with the highest evaluation by men than by women. In the researched company a quality of products, as well as tidiness in production sectors, and in the entire company.

From the attention the fact that in the process of producing seat belts striker main errors are during a production process so it is possible additionally to apply the FMEA method for identifying faults during production process. This method is supposed to prevent coming into existence some mistakes. By applying it is possible in the constant way to improve the product testing it and on this base to implement new solutions which effectively will eliminate the source of faults.

Additionally in the purpose of preventing some mistakes and faults in the production it is possible to apply system POKA- YOEK. This system could help operators to avoid mistakes during production process. It is possible to prevent mistakes already in the phase of the product designed. Thanks to that the company will be sure that the operation is carried out with appropriate components and in the appropriate order.

Results of the analysis allow noticing some action which the enterprise should take in order to improve the production process. Functioning of the production system, although now is working perfectly,

it is possible still to be improved. The quality of offered products can be improved through applying tools of the quality management.

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