

Importance of development factors in company dealing with cataphoresis coating method

Dorota Klimecka-Tatar¹

¹Institute of Production Engineering, Faculty of Management, Czestochowa University of Technology, Armii Krajowej 19B, 42-201 Czestochowa, Poland, e-mail: klimecka@wip.pcz.pl

Abstract: The main aim of presented in this paper results is analysis of the most important factors in the company activity. The questionnaire test were carried among persons employed by the company, which mainstream is method of cataphoresis anti-corrosion coating. In the paper also validity of the Toyota roof elements were defined. Based on research as the most important factors of the company mission, indicated the quality factor.

Key words – organization's mission, cataphoresis coating

1. Introduction

Cataphoretic painting is one of the types of electrophoretic painting, today it is the most common method of applying a primer layer in the automotive industry. Cataphoretic coating is one of the best ways to anticorrosion protection of steel, castings, plates, forgings, and aluminum components. It also is used for single-layer coating of utilitarian objects made of metal, such as electronic enclosures, covers and other items made of metal with a extensive surface area. Cataphoresis method replaced and displaced anaphoresis formerly known technology of metals coating.

This process consists in the fact that a painted detail constitute as a cathode. This detail connected to a voltage is immersed in a special solution in which cataphoretic painting takes the place.

At the beginning of the production process details are placed on hangers, then transferred by passable

hoists and sequentially placed into zones (bath) of washing line, surface preparation in accordance with previously presented in technology. After washing with demineralized water details are immersed in a bath filled with cataphoretic coating reagents.

The electrophoresis process followed by electro-deposition of particles of paint on the details (elements). Painted details are in the process of cataphoresis cathode (-), while the anodes (+) are resistant electrodes (metal sheet). Acid-resistant steel plates are placed in a box for electro-dialysis, and are hung along the walls inside the bath.

Details after emerging from the bath are transported to immersion washing baths. At this stage the details surface is flushing of an excess of paint items unrelated to the substrate. Rinsing followed sequentially in immersion washing zones, circulating ultrafilter UF-1, UF-2 washing, and spraying with demineralized water.

The extensive washing system provides to paint huge savings and also allows to receive coating without streaks and stains. After washing tags with details that have been drip of residual water are transferred onto the conveyor and then transported to the dryer, where the details are drying at a high temperature of 160 - 190°C. Details after drying are cooling on the conveyor hangers and then unloaded. Finished items are subject to quality control, and then are transferred to storage of finished products, and from there transmitted to the client.

2. Technological process

Cooperation with conglomerates automotive company, is not only a great challenge in terms of mean the high requirements for quality of offered product, but most of all a huge logistical challenge. For such a challenge requires not only adequate staff, but also adequate storage space with the appropriate parties separated zones, storage and issuing of goods.

The stages in the production of anti-corrosion coatings obtained by cataphoresis are as follow:

1. The raw materials storage (surface degreasing reagent, reagents for the surface activation, reagents for painting).
2. The elements for cataphoretic coating storage.
3. The elements transportation using pallet truck to the suspension position.
4. The elements hanging on the traverses and the control of elements.
5. Transport of suspended elements on the production line.
6. The reagents download from the magazine.
7. Spray degreasing (HENKEL reagent)
8. Immersion degreasing (HENKEL reagent).
9. Immersion washing.
10. Surface activation (HENKEL reagents).
11. Zinc phosphating with passivation (HENKEL reagents without chromium).
12. Immersion washing with demineralized water.
13. Spray washing with demineralized water.
14. Cataphoretic or anaphoretic coating (waterborne paint without lead or other heavy metals). Reagents and solutions BASF Coatings AG: Cathoprime QT82-9436 Automotive OEM Coatings, details covering with layer ranging from 15 to 40 µm, number IMDS 21795287/1.
15. Cascade rinsing with ultrafilter.
16. Immersion rinsing with ultrafilter.
17. Washing with demineralized water.
18. Details drying of the residual rinse water.
19. The coating three-stage drying in the electrical dryer with infrared

- radiations.
20. Transportation to the position of removing items from the traverses.
21. The product final control.
22. Packages download from the magazine.
23. Packing.
24. Transportation of finished product using a forklift to finished products storage.
25. Storage of finished products.

3. Experiment

In a BOST study carried out in company dealing with anti-coorislve coating. The question was concerned on the factors which in employees opinion is the most important elements in the operation of the company (LIKER J.K. 2005, BORKOWSKI S. 2011, BORKOWSKI S. 2013, ROSAK-SZYROCKA J. 2013). In the survey was selected five factors, which the workers have attributed to the appropriate assessment on a scale of 1 to 5, where a score of 5 defined the most important element. These factors include: the quality (JA), costs (KO), lead time (CR), work safety (BP), morale of the crew (MZ). The study included twenty eight employees work for company, which mainly deals with the method of applying a cataphoresis anti-corrosion coatings.

4. Results and disscusion

Based on the survey: comparison of assessment validity of the factors from roof of Toyota's House area is performed. The percentage structure of those factors presented in Tables 1. In this chapter range of factors' affecting on the increase in the products value and meet customer expectations (GRIFFIN R.W. 1996, FOLTYN H. 2009).

From Table 1 showing the factors' importance for the assessment 1 can be deduced that the largest number of votes has moral of the crew factor (MZ) with the number 53.6% of votes and factor costs (KO) 28.6% of votes.

The lowest number of assessments received a quality factor (JA), only 7.1% of the votes. However, none of the respondents the safety factor assessed at this level and it has received 0% of votes. A series validity in this case should be recorded as follows:

$$MZ > KO > CR > JA > BP \quad (1)$$

The assessment 2 was the most frequently indicated, in the case of costs factor (KO), up 39.3% of the

respondents. The lowest number of assessments 2 received quality factor (JA). A factors' series of importance for improvement in this case is as follows:

$$KO > CR > BP > MZ > JA \quad (2)$$

Table 1. Roof of the Toyota house. Numerical combination of the factors' importance. It concerns

Evaluation	Indicating the factors'				
	JA	KO	CR	BP	MZ
1	2	8	3	0	15
2	1	11	10	3	3
3	3	5	11	6	3
4	6	3	3	14	2
5	16	1	1	5	5

Source: own study

From Figure 1.3c shows that the delivery time factor (CR) was the most often assessed factor at level 3, such a note awarded him 39.3% of the respondents. The lowest number of votes, only 10.7% at level 3 received two: quality factors (JA) and morale of the crew (MZ):

$$CR > BP > KO > JA > MZ \quad (3)$$

The most frequently rated at level 4 by respondents factor has proven to be work safety, up 50% of the respondents considered its validity at this level. The smallest number assessment 4 received morale of the crew factor. Similarly to the previous evaluations recorded a factors' series valid:

$$BP > JA > CR > KO > MZ \quad (4)$$

Focusing on superior assessment 5, which seems to be most important in improving the company's operations. An overwhelming majority, about 57.1% of votes as the most important factor the quality (JA) has been considered. The assessment 5 subsequently gained work safety (BP) and morale of the crew (MZ) factors, equally by 17.9%. The least frequent evaluated as the most important element were delivery time (CR) and costs (KO), which received just 3.6% of the respondents' votes.

$$JA > BP > MZ > CR > KO \quad (5)$$

Due to the fact that the roof of Toyota's house refers mainly to the client, which indirectly determines the success of company and without the client the company can not exist. Ranking of the fundamental factors described in the area E1 of BOST questionnaire helps to guide the company's activities in the direction to bringing the greatest value and meet customer ex-

pectations. Averaging the results obtained in the study allowed to present the factors' series - the validity of the enterprise mission (1.6).

$$JA > BP > CR > MZ > KO \quad (6)$$

5. Summary and conclusions

Based on the BOST analysis carried out among the twenty-eight persons of the company crew, the most important factor of the area E1 (of quality, morale of the crew, delivery time, work's safety, cost) was indicated the quality factor (JA). As many as 57.1% of respondents considered it is more important than, work safety and morale of the crew, which received 17.9% of the votes. Factors costs and delivery time gained just 3.6% of the votes, although in the company are equally important during the production of anti-corrosion coatings.

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