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Improvement in Production Process for Pipelines Manufacturing Based on Quality Management Method

V.Yu. Antsev, N.A. Vitchuk, V.V. Miroshnikov

Tula State University, 92, Lenina, Tula 300012, The Russian Federation
Kaluga Branch of the Bauman Moscow State Technical University, 2, Bazhenova, Kaluga 248000, The Russian Federation
Bryansk State Technical University, Boulevard 50 years of October, Bryansk 241035, The Russian Federation

Abstract

The increase in the demand for gas turbine engines makes the domestic manufacturers work on a timely supply with the produce mentioned. The possibility to increase the timely provision of consumers with gas turbine engines of the required quality in the required volume is valid based on the introduction of quality management methods. Thereupon the researches directed to the development of production update for pipelines gas turbine engines manufacturing based on quality management methods are urgent. The purpose of the research consists in the development and substantiation of recommendations for the improvement of an industrial process of pipelines manufacturing for gas turbine engines based on a quality management method. To achieve the purpose the scientific regulations of General Quality Management, the computation methodology of single and complex indices of industrial process quality, methods for the analysis and control of processes, structural and functional modeling IDEF0, statistical methods of quality management, the methodology of designing reengineering an operating process were used.

Because of the successful implementation of the activities, which are anticipated in every stage of reengineering, the decrease of industrial process duration in pipelines manufacturing, increase in labor productivity, the increase of the level of production automation. All this will allow improving the enterprise ability to provide the consumers with gas turbine engines of the necessary quality in due time and in the complete range providing consumers.

Keywords: quality management method; production process; gas turbine engine; analysis; incremental improvement; reengineering; production area pipelines.

* Corresponding author. Tel.: +7-920-888-81-12.
E-mail address: vitchuk.natalya@mail.ru

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1. Introduction

The gas turbine engine production is one of the promising directions in the development of modern domestic power machine building that follows from the power strategy of Russia for the period up to 2030. This strategy makes provision for the increase in demand for gas turbine engines that puts domestic manufacturers a task of timely provision of the home market with competitive engines [1].

Among domestic manufacturers of gas turbine engines one can emphasize some enterprises, for example, scientific production enterprise “Saturn”, “UMPO” Co., “Perm Motor Plant” Co., FSUE “SPC of Gas Turbine Engineering “Salute” and so on, and also “Kaluga Engine” Co., which is situated in Kaluga. The basic field of the enterprise activities is the development and production of special equipment - gas turbine engines and gas turbine power stations.

To the group of consumer goods belong petrol power units and motor pumps, motor units of different modifications, motor cultivators. Civil production consists in parts and assembly units for electric trains and electric locomotives, and also component parts for aeronautical engineering.

2. Target setting

At present the enterprise tries to keep and increase a purpose segment of the market for gas turbine engines sale. But timeliness in the satisfaction of existing and predicted needs in gas turbine engines by potentialities of Kaluga Engine Co. raises doubts as comparison of actual and planned indices of the gas turbine engines production allowed revealing deviations in the terms of manufacturing this kind of produce. To determine reasons of deviation occurrences there were analyzed data of accounts of Microsoft Dynamics AX: “Production Rhythm”, “Fulfillment of Week Plans of Production”, “Scheme of Output”, “Deviation in Quantity” and others.

The distribution of the volume of gas turbine engines output according to years during the period investigated is shown in Fig. 1, which demonstrates stability of orders for the given kind of enterprise production.

![Fig. 1. Volume of gas turbine engines output in 2013 - 2015.](image)

Results of accounts analysis are generalized and shown in Table 1.

From Table 1 it is evident, that the actual fulfillment of production orders for gas turbine engines during the period analyzed does not correspond to the plan, that is, it is possible to judge of failure in the satisfaction of customer needs of this enterprise.
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