Development of knowledge management process at the enterprise of technical service of the agro-industrial complex

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Abstract. The creation of approach of knowledge conduct at the enterprise of technical service of APC is established. Several items were established in this article: the normative base, the model and specification of knowledge conduct for the enterprise of technical service of APC, the procedure for creation and implementation of conduct knowledge process at the enterprise of technical service of APC.

In the recent years the considerable increase of industrial complex in Russia and its effective development require a qualitative and modified operation of support service and repair of agricultural machinery [1].

The engineering technical system of APC is the basis for manufactory, food safety and processing of agricultural products [2]. Many types of agricultural machinery are widely used in the branches of agriculture [3]. The modified operation in production processes is impossible without suitable technical support and repair of agricultural machinery.

As you know, the repair of equipment is one of the most difficult processes, since high qualification requirements are imposed on the participants [4]. From the outside, the requirements for personnel may seem excessive, but they are not. So the head of the repair process, on the one hand, must have in-depth knowledge of how to detect malfunctions and restore the broad strata of the population of the nomenclature of parts made not only from various metals and their alloys, but also polymers, with a different ability to hear and, if necessary, receive information in accessible language as to the customer and the direct executor. Both of these sides force the manager to think outside the box outside of the stereotyped solutions [5]. From the performers of the repair, in-depth knowledge is required in its specialized field, which allows the correct use of detection means, methods of intervention in each specific situation.

Also, a wide variety of applied equipment and constant updating of the model range lead to increased requirements for knowledge, while in addition to direct repairs, service services should also accumulate statistics on emerging failures and transmit it to the manufacturer's plant, if possible, with recommendations for their elimination, because it is they who work directly with the client and are...
forced to quickly and accurately find the right solutions, especially when a new model is introduced to the market [6].

The accumulative system of technical support and repair of agricultural machinery in Russian APC is in critical situation and does not correspond the international practice and requirements [7]. Among this, agricultural producers provide technical work themselves. Such situation cannot provide the required level of availability of agricultural machinery, repair and technical support lead to national labour inputs and, ultimately, labour productiveness in APC decline.

Recently, the analysis of APC development shows that a new system of technical support and repair is formed within the development of agricultural production.

The modern approach of providing quality management at the enterprises of APC should be used in order to solve the problem of technical support of agricultural machinery. The most widely used approach in quality problems is quality management systems implementation at the basis of international standards ISO 9000. This systems are based on the main quality management principles, system and process approaches and show the international experience in quality management of production and service.

The implementation and certification of quality management based on MS ISO 9000 at the enterprise provides not only a high quality of products, but gets a primary advantages on the production market of technical support and repair of agricultural machinery, increases company image.

One of the most significant modulation in the last version of ISO 9001 is the implementation of obligatory requirements in relation of conduct knowledge. It is required to determine and provide the knowledge management of organization for processes modified operation and achievement of products correspondence. The requirements that is related to knowledge was implemented in order to protect knowledge loses, through the personnel defections or the impossibility of getting and changing knowledge, among this the company stimulation at the basis of knowledge training, studying practice, guidance and so on.

The quality management systems are implemented at the leading enterprisers of technical support. The conception of conduct knowledge management is reported in the last version of international standards ISO 9000 at quality management systems. According to GOST R 53894-2016 a conduct knowledge is a special discipline approach for achieving goals of enterprise with the use of knowledge. This knowledge of modified operation of processes and correspondence of products should be noted at the enterprise. The knowledge should be available and controlled.

Considering that the obligatory requirements in relation with knowledge of organization are realized in the fifth version of national standard GOST R ISO 9001-2015, the realization of this process at the technical support enterprise does not review in exemplary project of GOSNITI nor in methodological recommendations in Ministry of agriculture on the quality management systems at the enterprisers of technical support of APC complex. According to the abovementioned, the development of conduct knowledge system is the most important aim at the enterprise of technical service.

A knowledge of organization is the knowledge for company, obtained from company experience. Knowledge is the information which is used and exchanged for organization objectives.

The basis of knowledge of dealership centers of agricultural machinery and another enterprisers of technical support are the external and internal sources. The internal sources are included ownership, knowledge from experience, conclusions from different projects, collection and exchange of non-documented knowledge and experience, the results of processes improving, production, service and so on. The example of external sources are standards, conferences, seminars, knowledge, obtained from agricultural producers and external producers.

The knowledge management is necessary for technical support enterprise of APC in order to provide new possibilities for increasing quality of technical service and repair of agricultural machinery.
The basis of the normative framework for the process of conduct knowledge at the enterprise of technical support of agro-industrial are compared with the national; standards, which are important and shown at the table 1.

**Table 1.** Basic national standards in the field of knowledge management.

| Designation of the Standard | Name of the Standard                                                                 |
|-----------------------------|--------------------------------------------------------------------------------------|
| GOST R 53894-2016          | Knowledge management. Terms and definitions                                           |
| GOST R 54146-2010          | Knowledge management. Guidance for small and medium size enterprises                  |
| GOST R 57127-2016/PAS 2001:2001 | Knowledge management. A guide to good practice                                      |
| GOST R 54875–2011          | Knowledge management. Good practice guide for knowledge management system implementation |
| GOST R 54876–2011          | Knowledge management. Guide to securing correlation between knowledge management and the standard of organization and other organizational processes |
| GOST R 57132-2016          | Knowledge management. Linking knowledge management with other organizational functions and disciplines. A guide to good practice |
| GOST R 57133-2016          | Organizational culture and knowledge management. A guide to good practice             |
| GOST R 57134-2016          | Knowledge management. Skills for knowledge working. A guide to good practice          |
| GOST R 57325–2016          | Knowledge management. Guide for writing standards taking into account the needs of micro, small and medium-sized enterprises |
| GOST R 57319–2016          | Knowledge management. Successful achievement of aims of a guide for small business    |
| GOST R 57320–2016          | Knowledge management. Implementation of process-oriented knowledge management in small and medium-sized enterprises |
| GOST R 58192-2018          | Knowledge management. Implementing of knowledge management in small and medium-sized enterprises |

According to the requirements of GOST R ISO 9001-2015 the model of conduct knowledge management for the technical service enterprise (picture 1) and process specification (table 2) were created in order to realize the exemplary approach for quality management system implementation for technical support.

The documented procedure of the process of conduct knowledge management at the enterprise of technical service of agro-industrial complex must be included:

- planning of the process «Conduct knowledge management»
- identification of the database at the enterprise of technical service
- renovation of the database
- storage of the database
- knowledge exchange
- instrumentation of the database
- conformation of personnel capability for knowledge
- the analysis and valuation of the process results
- corrective and improving actions of knowledge management.
Figure 1. Model of the process "Knowledge Management" at the enterprise of technical service of the agro-industrial complex.

Table 2. Specification of the "Knowledge Management" process for the QMS of the agro-industrial complex technical service enterprise.

| Process code | p. ISO 9001 | Process name |
|--------------|-------------|--------------|
| organization standard QMS XX–2019 | 7.1.6 | KNOWLEDGE MANAGEMENT |

**Process definition**
Identification, updating, storage of the knowledge base, exchange, application of the knowledge base and the formation of personal abilities for knowledge to maintain and improve the QMS processes

**Process owner**
Quality Management Representative

**Process consumers**
Agricultural producers, divisions and personnel of the agro-industrial complex technical service enterprise

**Process providers**
External organizations, divisions of the enterprise, consumers

**Requirements for inputs**
Completeness and correctness of data, systematization of knowledge

**Process resources**
Infrastructure, finance, personnel, equipment

**Measured and controllable process characteristics**
The volume of the knowledge base, the degree of documentation of the knowledge base, the number of inconsistencies identified during the audit

**Process performance indicators**
The degree of implementation of the plan for the formation of the knowledge base
Number of nonconformities in process audit
Level of implementation of corrective actions in the knowledge management process
The development and implementation of the conduct knowledge process at the enterprise of the technical service of APC should be carried out through the implementation of the following stages:

- Organization of work on the implementation of the process.
- Development of goals and objectives for the implementation of the conduct knowledge process.
- Assessment of the real state of bases and flows of knowledge.
- Development of tools and methods of knowledge management.
- Implementation of the conduct process in the activities of the QMS, education and training of personnel in tools and methods of knowledge management.
- Evaluation of the results of the implementation of the conduct knowledge process, development and implementation of corrective actions.
- Development and implementation of projects to improve the knowledge management system of APC technical service enterprise.

When introducing a knowledge management process at APC technical service enterprise, it is advisable to use the recommendations of GOST R 54875–2011.

The introduction of the conduct knowledge process into the QMS should be considered as a prerequisite for the sustainable development of the APC technical service enterprise. Conduct knowledge management increases the ability to respond to internal and external risks, ensures customer satisfaction, increases the efficiency and effectiveness of processes, the quality of services for the maintenance and repair of equipment, the image and image of the APC technical service enterprise.

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