International Journal of Engineering & Technology, 7 (4.38) (2018) 1263-1265

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

Optimization of the Automated System in Production

Svetlana Valentinovna Yudina*[1], Svetlana Anatolievna Ashirova[1], Olga Petrovna Mikhailova[1], Rustam Salavatovich Shamsutdinov[1], Ivan Ivanovich Timofeev[1], Liliya Zinnatullovna Ryazapova [2]

[1]Kazan National Research Technical University named after A.N. Tupolev – KAI, Karl Marx str., 10, Kazan 420111, Russia
[1]Kazan National Research Technological University, Karl Marx str., 68, Kazan 420015, Russia
**Corresponding author E-mail: svetlana.yudina.80@list.ru*

Abstract

The article considers practical aspects of automated system optimization in production. Optimal organization of all business processes and monitoring aiming at greater efficiency and profitability of the enterprise is often the main problem of management. For operational decision-making, information about the operation of all company divisions is needed. Obtaining, processing, and presenting such information in the form applicable for further actions, needs a simple convenient tool. A system of enterprise operation automation is designed to perform the role of such a useful auxiliary.
The purpose of the present study is to develop and test new modules automating accounting characteristic of the organization and extending beyond the standard solutions, as well as to prove that increasing the collection efficiency of information about the enterprise operation entails a reduction in the complexity of work associated with the accounting and payroll.

Keywords: *automated system, software modules, accounting automation, module on surcharges.*

1. Introduction

Business integration and consolidation leads to the fact that the requirements for information systems are increasingly becoming more complex [4]. High growth dynamics of the contemporary Russian market cause continuous improvement of business conducting tools and professional management of the enterprise [11]. In this regard, enterprises face the problem of adaptation and development of new modules for automated control systems.
The relevance of such systems is primarily determined by corporate objectives, such as the growth of the enterprise, timely information about the status of assets, business continuity, and increase in the market value of the company. Economic goals consist in increasing sales, achieving the optimal share of profit, ensuring profitability, reducing costs to a greater extent due to the enterprise operation efficiency [2].
Any system affecting business and tax accounting should be adapted to the changing legislation, and therefore, it is necessary to find developers who could subsequently provide corresponding support at the proper level [12]. Therefore, in most cases, it is practiced to adapt the existing product to the needs of the organization, i.e., to develop new modules that automate the accounting characteristic of the particular organization and extend beyond the standard solutions [5].
The aim of the present study is to increase the efficiency of information acquisition about the enterprise activity, reducing the complexity of work in the accounting and payroll. To achieve this goal, the management of the organization decided to implement premiums and surcharges module into the program "1C: Salary and personnel management 8".

2. Problem statement

During the survey of payroll and personnel accounting, specific features are revealed at many industrial enterprises.
- When calculating the wages of employees of the organization located in the Northern regions, the district coefficient is applied [7]. If employees of such organizations are sent on a business trip outside the region, they can be paid a salary taking into account the district coefficient of the region of business trip [3]. At that, the hourly base wage rate does not change, while travelling expenses are not paid, i.e. payment is made by the hourly rate [9].
- Remuneration of employees working on transfer machinery is made based on the hourly rate for actually worked time. At that, the base rate depends on the particular transfer machinery. Besides, there are also various types of work on machinery, the cost of which depends directly on the hourly rate.
- The payment of bonuses from the collective fund requires follow-up revision of the program "1C: Salary and personnel management".
To pay by types of payments to employees working on machinery, it is necessary to conduct follow-up revision of the "1C: Salary and personnel management" configuration. As part of the program follow-up revision, the following tasks need to be completed [8]:
- accounting for payroll for employees working on transfer machinery;
- accounting for two types of bonuses from the collective fund (monthly and annual)

Copyright © 2018 Authors. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

3. Development of hardware and software complex, its components and databases

As part of the follow-up revision of the "1C: Salary and personnel management" program, the following accounting mechanisms should be implemented:
- payroll accounting for employees working on transfer machinery;
- accounting for bonuses from the collective fund (monthly, quarterly, and annual).
Follow-up revision is made using the mechanism of distributed information databases, which is designed to create geographically distributed systems based on identical configurations "1C: Enterprises", and allows transferring both changes in data and changes in the information base configuration [13].

3.1. The paper should have the following structure

Based on the analysis conducted during the survey, the following conclusion has been made: the remuneration of employees working on transfer machinery consists of wages for repair works and wages for work on specific transfer machinery equipment.
The revision requires conducting the following preliminary work. Personnel department fills out the transfer machinery directory, specifying types of works on particular machinery and their cost. These operations are repeated until emergence of new names of machinery, types of work or changes in tariffs.
Personnel department forms on a monthly basis a document "Work done on the machinery", which indicates by whom and to what extent the work was performed, and calculates piecework pay. The number of such documents per month is not limited. The document must be accounted in a special register, from where data will be included in the payroll.
The following data structure is proposed to store information on payment for work done on various types of machinery.
Reference book "Machinery" for storing information about the machinery on which the work is performed.
Information register "Payment-For-Work-On-Machinery" to store information about wage rates and additional payments for work on specific machinery. The register is filled in manually by the user.
Accumulation register "Work done on machinery" for storing information on employees' wages for work on specific transfer machinery. Information is recorded into the register programmatically when carrying out the document "Work done on machinery".
The document "Work done on machinery" for the calculation of the accrual of employees working on specific machinery must carry the following information: organization accruing wages; date of document registration; the responsible person; list of employees, indicating: the specific machinery on which they worked, the type of calculations, the amount of work, and the number of days and hours worked. Besides, there should also be a final column – the result of the accrual calculation [10]. The document provides for standard processing mechanism of the document, typical for the program (filling in the table part according to various criteria, clearing the table part of the document, etc.) [1].
It is allowed creating any number of documents "Work, done on machinery" during the accounting period. When calculating the salary, data on work done from various documents during the accounting period are summarized.
The number of records in the tabular part of the document is equal to the number of employees multiplied by the number of machinery on which they worked and the number of calculated allowances [6]. A sample of the tabular part of the document is given in Table 1.

Table 1: The table part of the document "Work done by the employees"

Employee	Machinery	Method of calculation	Amount	Number of days worked	Number of hours worked	Result
Ivanov I.	Tractor	Work on machinery	31.26	3	24	750.24
Ivanov I.	Tractor	Work on machinery	37.86	21	182	6,890.52
Ivanov I.	Tractor	Repair works	20.67	1	16	330.72
Ivanov I.	Tractor	Extra charge for work at customer	25		24	187.56
Ivanov I.	Tractor	Extra charge for work at customer	30		182	2,067.15
Ivanov I.	Tractor	Surcharge for work on weekends	100		16	500.16
Ivanov I.	Tractor	Surcharge for work in the evening	20		91	689.05
Ivanov I.	Tractor	Surcharge for professional skills	50		182	3,445,26

3.2. The document "Surcharge from the "collective fund" on monthly results"

The organizations practice payment of bonuses to employees from the "collective fund". The amount of additional payment is distributed in proportion to the work done by employees and their individual performance factor (IPF), which is available from the personnel department.The monthly bonus is calculated according to the following algorithm. The list of employees recommended for bonuses is provided by the personnel department along with their IPF. Initially, the main accruals are collected according to the list of employees. Then the total earnings of all employees, taking into account their PPF, are calculated.

3.3. Document "Remuneration from the reserve at year-end "

Payment of the annual bonus is made only to employees who have worked at the organization for at least a year. Amounts on the main charges to employees are collected for the year. The number of years worked by the employee at the enterprise is taken as the individual performance factor. Then the calculation of the surcharge base is performed.

4. Solution of set tasks in consequence of "1C: Salary and personnel management" program adaptation

According to the task set during the survey, the program adaptation requires making changes to the documents of payroll accounting (in order to display information about the work done on the machinery) as well as to the accruals calculating procedure (accrual of monthly and annual bonuses from the collective fund).
In the course of solving the problem the following objects were developed:
1. Reference books: "Machinery" and "Types of payment of works performed on machinery".

2. Information register: "Payment for works done on machinery". Document: "Input data about the work done on machinery" to enter charges for staff working on the machineries.
3. Accumulation register: "Work done on machinery" to store information about employees' wages for work done on specific machineries.

5. Conclusion

The program "1C: Salary and personnel management" was modernized.
- To implement the payment mechanism of employees who work on transfer machinery, two reference books were created for storing information about transfer machinery and corresponding type of works, information register to store data about the cost of works, the register to accumulate and store information on work done by employees, and the document to fill in data.
- Two documents were created to reflect surcharges from collective fund following the results of the month and year.
The conducted work resulted in an increase in the work efficiency of accounting and payroll accounting departments that ultimately will ensure the smooth operation of the enterprise and lead to an increase in the enterprise profits. The proposed program can be recommended to financial and management accounting departments.

References

[1] Metodicheskie materialy po «1S: Predpriyatie 8.1». [Methodical materials on "1C: Enterprise 8.1"] "Firm 1C", Moscow, 2007.
[2] Rukovodstvo k svodu znanij po upravleniyu proektami [A guide to the project management body of knowledge], Third edition, Institute of Project Management, Moscow, 2014, p.238
[3] Trudovoj kodeks Rossijskoj Federacii [The Labor Code of the Russian Federation], Omega-L, Moscow, 2008, p. 277
[4] Baryshnikov, A., Dzyabchenko, A., Matveev, S. et al., EHlementy tekhnologii standartnogo vnedreniya [Elements of standard implementation technology], "1C" Firm, Moscow, 2017, p. 250
[5] Gabets, A.P. and Goncharov, D.I., 1S: Predpriyatie 8. Prostye primery razrabotki [1C: Enterprise 8. Simple examples of development], "1C-Publishing", Moscow, 2015, p. 420
[6] Gabets, A.P., Goncharov, D.I., Kozyrev, D.V., Kukhlevsky, D.S., and Radchenko, M.G., Professional'naya razrabotka v sisteme 1S: Predpriyatie 8 (+CD) [Professional development in the 1C system: Enterprise 8 (+CD) system], Ed. by M.G. Radchenko. "1C-Publishing", Moscow, 2016, p. 808
[7] Kondrakov, N. P., Buhgalterskij uchet [Accounting], INFRA-M, Moscow, 2006, p.592
[8] Mitichkin, S.A., Razrabotka v sisteme 1S:Predpriyatie 8 [Development in the 1C: Enterprise 8 system], "1C-Publishing", Moscow, 2013, p. 413
[9] Trunin, I.V, «1S: Predpriyatie 8» v nauchno-issledovatel'skom institute ["1C: Enterprise 8" in the research institute], Financial Newspaper, No 48, 2017. pp. 24-27.
[10] Usilov, T.N., Predpriyatie. EHffektivnoe programmirovanie [1C: Enterprise. Effective programming], New Knowledge, Moscow, 2014. p. 446
[11] Kharitonov, S.A., Buhgalterskij i nalogovyj uchet v programme «1S: Buhgalteriya 8.0» Prakticheskoe posobie. [Financial and tax accounting in the "1C: Accounting 8.0" program. Practical guide], "Peter", St.Petersburg, 2016. p.544
[12] Kharitonov, S.A., Nastol'naya kniga po oplate truda i ee raschetu v programme "1S: Zarplata i Upravlenie Personalom 8.0" [Handbook on labor pay and its calculation in the "1C: Wages and Personnel Management 8.0" program], "1C-Publishing", Moscow, 2016, p. 594
[13] Raspredelennye informacionnye bazy v sisteme “1S: Predpriyatie 8” [Distributed information bases in the "1C: Enterprise 8" system] Retrieved from http://v8.1c.ru/overview/RaspredBases.htm