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Modeling business process of labor intensity calculating the machine-building equipment's production

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Abstract – the main aim of this article is the solution of actual reengineering business process problem of labor intensity calculation, which is carried out at the JSC Nasosenergomash enterprise. The model of the existing process is formed in this work, which analysis allow to identify factors that reduce the effectiveness of the calculation. As a result of the research was formed a renewed model of the updated business process, without revealed faults. The technology, which will allow the reengineering business process is proposed and will lead it to the new model.

Keywords – database, Intermech, information system, conversion, DBF, MSOL, software module, reengineering, labor intensity.

I. INTRODUCTION

The activity basis of any organization is represented by its business processes, which are defined by the purposes and tasks of business entity activity. Processes provide realization of all kinds of the enterprise activity connected with production of goods or services by the business entity.

Priority in the market is one of indicators of effective work of the enterprise and its functioning in modern competitive conditions, mechanisms is necessary which can simplify difficult processes or modernize outdated.

Business process of labor intensity pumping set calculation is carried out at the Sumy pump plant JSC Nasosenergomash. Calculation of labor input of pumping set production is very important process at the enterprise. It allows to create data which calculation of salaries of the workers involved in production of one machine-building unit.

Before putting into operation of computer facilities these calculations were carried out on paper. With adoption of computer facilities, labor calculations were made by means of computer technologies, special software was developed for department of the organization of work and salaries.

With development of information technologies there was a production automation. PDM system Intermech was introduced in the enterprise that allowed to start electronic system of document circulations. However process of labor intensity pumping set calculation was almost without changes.

In the outdated database large volumes of data which are necessary for labor intensity calculation are already saved up, but the structure and a format of saving data in the outdated database differs from Intermech.

It makes impossible a direct transferring of data to one system, a common information space. For such circumstances completion of calculations cannot be automated in full, and in the course of data transferring can be a mistake.

Therefore the aim of this research is increasing business process of labor efficiency calculation of pump equipment production in the enterprise.

II. THE ANALYSIS OF EXISTING BUSINESS PROCESS

It is known that guarantee of successful reengineering realization of any business process is well-grounded analysis of the existing condition of process. So, at first it was study in detail the business process of labor intensity calculation how it is realized by employees of the enterprise for this time.

According to the IDEF0 it is made structurally functional model AS - IS, one of levels of it is given in fig. 1.

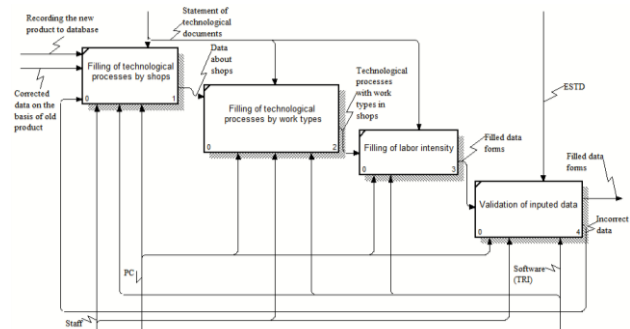


Figure 1. Model As-Is of data transfer process in the manual mode

The analysis of the existing model showed that now there are several factors which considerably reduce the given business process efficiency.

The database which keeps all information on calculations represents a set of tables in the DBF format and index files to them that are saved in different catalogs in the hard disk drive of the server.

The structure of the database is not perfect. For example, for annual release of the equipment it is created

the separate table. At the same time in such cases duplication of information is observed. It leads to the fact that the number of tables files considerably grows from year to year.

The control system of the TRI database works in MS emulation mode - DOS. So for the work of a program in some computers is installed out-of-date Windows XP, in others - the virtual machine with Windows XP. In the course of work with the program loading of the processor fluctuates in a section of 90-95%, and it complicates doing of parallel tasks.

The structure of the database imperfect, in particular it is made the new table for annual set's production.

There are no autoincremental field in table, also links between tables are absent. Labor intensity calculation for set details is not provided only on some technological processes.

An employee in the manual mode search analogs and enters additional data in the table of розцеховочний маршрут of the set which are obtained from the "Techcard" software which is a part of PDM – system Intermech.

The results of labor intensity calculation received of "TRI" are transferred to the Intermech system in the manual mode.

In general it is possible to make a conclusion that business process of labor calculation of machine-building production actually does not correspond to the updated concept enterprise's work, but it can't refuse it because the data which were saved up during a long time are used for different analyses and calculations. So it needs modernizations.

III. MODEL OF UPDATED BUSINESS PROCESS

It is necessary to make an advanced To - Be model of business process for successful reengineering realization of it and factors elimination earlier defined. The main aim of the new business process organization is the accomplishment's transferring of all its stages by means of Intermech system modules. The updated structural – functional diagram of business process is shown in fig. 2.

All the work will be within single support system of Intermech production in proper modules unlike existing business process. This is simplify the given business process' completion.

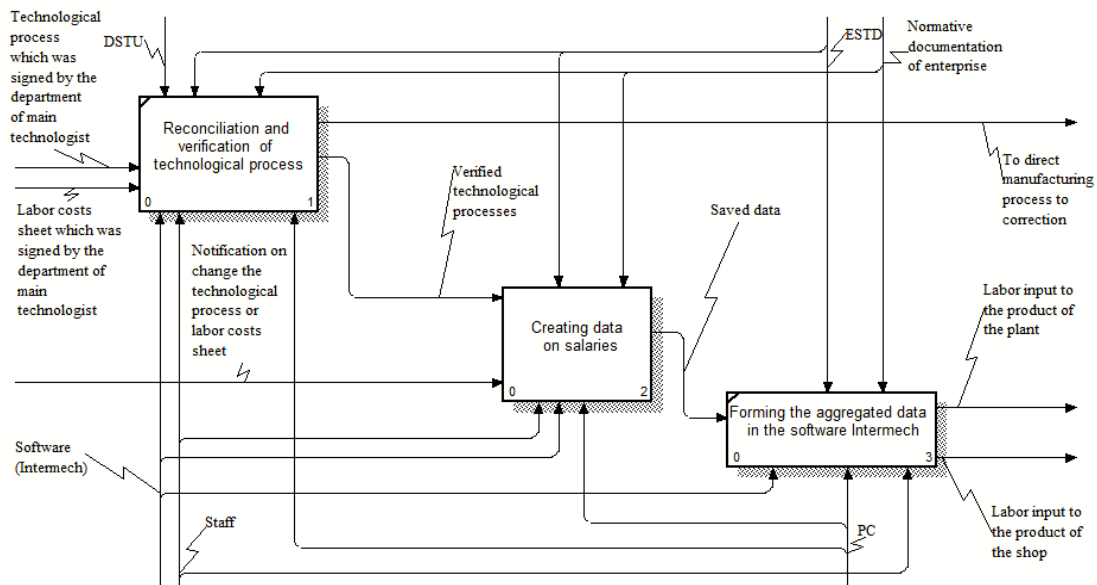


Figure 2. Model To-Be of the Business Process

For example, if an employee finds errors in documents by data verification, when he opens the previous registrations about some set, or the set very similar to specifics production, then the given documents return in system with the reason of returning.

This process allows to save time for coordination of documentation which was spent for preparation service notes, signatures and stamps gathering and also for documents transfer between departments.

All necessary reports are formed by the built means, are registered in the system and are saved in electronic archive automatically.

The presented process of labor intensity calculation correspond to the working concept of the enterprise in a common information space of an automated control system of Intermech.

At first it allows to refuse completely the outdated software and virtual machines that free computer resources.

Secondly – transfer to single document system will allow to see all made changes in registrations in the shortest time that in turn reduces time for data processing and preparation necessary analyses and reports.

IV. BUSINESS PROCESS' REENGINEERING

The existing business process' reengineering is offered to be executed due to realization of several stages. Generally business process' reengineering scheme which is considered is shown in fig. 3.

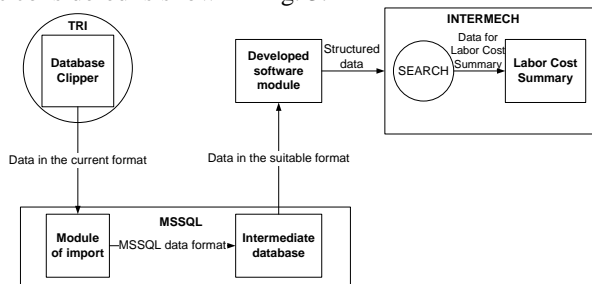


Figure 3. Scheme of the reengineering process

The aim of this research is to find differences in structures of databases and a way of reduction of an old data format in a database which is used in Intermech.

A key role in reengineering of labor intensity process calculation is played by transferring of data to a common information space as this step provides future opportunity to operate with data in the Intermech system. Reorganization of business process has to begin with it.

At the first stage it is necessary to investigate structures of these tables TRI and Intermech in details. The aim of such research is to find differences in structures of databases and a way of reduction of an old format of data in a database format which is used in Intermech. Directly, there is no instrument of import of data from DBF format in a control system of the Search database. Therefore the following scenario is proposed. At first it is necessary to create the intermediate local database in Microsoft SQL Server as all databases of the enterprise use this format. To import data from tables of an old format. Tables import occurs without the previous structuring of the existing data. However in the course of the import completion by the built means of the program SQL Server Management Studio module it is possible to edit structure of database tables, leading them in correspondence with the database which is used in Intermech. In particular, it is necessary to lead types of these fields of the existing tables to the corresponding types of these new created tables as formats of fields in databases are differ and an error of data import ensue. The corresponding adjustment are made in the manual mode in the editor of the table of the import module of MSQL. It is also necessary to unite the same tables in one. For the correct tables organization in the intermediate database it is necessary to create key fields in tables and connect registrations between tables by keys. Then it is necessary to transfer information from the intermediate database to a control system base Intermech. Considering data size which are kept in the old database and the probability of emergence of mechanical mistakes, manual transferring of data is economically and logically inexpedient. So it is expedient to develop the software

which would automate the last stage of data import. The program module has to carry out such functions: revision of tables structure of the intermediate database; key fields assignment; tables linking; import all information which contains in tables of the intermediate database to the database of the Intermech system, providing avoidance of empty registrations and data duplication. After accomplishment of the described actions data will be imported to Search control system and available to use by other Intermech modules.

CONCLUSIONS

In a research is proposed the technology actual problem's solution business process' modernization of labor intensity calculation pump set production which is carried out at the Sumy pump plant JSC Nasosenergomash. The research of the existing business process condition is conducted with use of modern methods of the reengineering process organization. The structurally functional model of the studied process is constructed according to the IDEF0 standard. The well-grounded system analysis of the received model allowed to allocate those stages and factors which reduce efficiency of given works accomplishment. As a result, business process completion of the existing technology leads to considerable waste time for information transfer between the different software which accompanies this process. The work is made for modeling such business process that negative factors would be eliminated.

A result of the research is an updated business process model of labor intensity calculation of the machine-building equipment production. A new model advantage is ensuring business process accomplishment of PDM in a common information space PDM system automation production Intermech which functions at the enterprise. It is proposed a technology by authors for realization of the constructed model which consists of several separate stages and will allow to execute the business process reorganization. Business process modernization of labor intensity calculation of pump equipment production for the proposed technology will allow to reduce time and expenses on carrying out the corresponding calculations. Also it will promote simplification and acceleration of process of document flow between enterprise's departments.

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