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Improving the Efficiency of the Management Staff of Motor Transport Enterprises

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***Abstract.** The article deals with the technology of solving accounting, statistics and management tasks of automobile transport enterprises to improve the efficiency of management personnel. Due to the main factors, the use of computers to solve management tasks greatly improve the efficiency of personnel: reduce the amount of information used by staff; increase the speed of processing information flow; increase the reliability of information processing results. The efficiency of managers is closely related to the application technology that handles the flow of information. In order to quantify this impact, an appropriate methodology and set of criteria must be in place to assess the reasonableness of the flow of information. This article is devoted to the solution of these issues. Effective management of a motor transport company should be based on a continuous and reliable flow of information about the environment, about internal changes in the controlled system itself. Current information should flow to certain levels of the decision-making hierarchy within the competence of each level.*

***Keywords:** work efficiency, management personnel, information technology, accounting of solutions, statistics and management tasks, automotive transport enterprises, electronic computers, norms and information reference database management systems, information flow of rationality for assessing indicators.*

Introduction

The most important preliminary improvement for the management of the efficiency of personnel motor transmission industry (ATP) is the improvement of technology to solve accounting, statistics and management tasks. Effective decision-making is necessary for the performance of managerial functions. The effectiveness of management decisions should be understood as a degree of compliance with the nature of solving tasks and the development of production systems. It is a management system that analyzes the results of management decisions, predicts, optimizes, achieves clear goals for economic justification and a variety of options in the choice of alternatives. The efficiency of management personnel is closely related to the technology used to process information flows. To quantify this impact, it is necessary to have an appropriate methodology and a set of criteria to assess the degree of rationality of information flows. This article is devoted to solving these issues.

Research results

The use of electronic computing machines (computers) for solving managerial tasks provides a significant increase in the efficiency of personnel due to the main factors: reducing the amount of information that the staff works with; increasing the speed of processing information flows; increasing the reliability of the results of information processing.

The user of the computer to solve the management task provides a significant increase in efficiency due to the main elements of the employee, reducing the amount of information, the employee increases the speed of information processing, the flow increases and the reliability of the resulting information processing.

Reducing the volume of processed information is determined by the following factors: when using a computer there is no need to form auxiliary documents, all reports, reports, statements,etc. Automatically generated by the computer system, various intermediate documents (e.g., the mileage certificate of the car) do not contain this information to transmit all sectors of ATP through communication channels (if there is a computer network) or through flexible magnetic media; there is no need to work with documents containing normative reference information(NSI), since all this information is contained in the database (DB) of information.

Increase the speed of information processing: using the natural speed of the computer (performing operations); increase the speed of finding NSI databases in the information system; increase the

speed of preparing and transmitting information through communication channels of the system or through flexible magnetic media.

Reducing the number of errors means increasing the reliability of processing information and quality of decisions, decisions by the following circumstances. Modern database management systems (DBMS) have a special set of tools that eliminate total input errors. This allows the operator to pause data entry while working on the keyboard, enter the correct information with the appropriate warning message. Almost all modern software tools provide the implementation of the «appearance and selection» mode when entering and analyzing information. This mode eliminates the distortion of the NSI contained in the database of the computer system. Subsequently, through the ATP implementation of information exchange between communication channels or through magnetic media, errors in the unique transmission data is completely excluded by rewriting it into other documents. Errors that occur when performing arithmetic operations when calculating on a computer are completely excluded.

Overhead costs associated with the maintenance of management personnel are determined by the formula:

$$З_{Н} = \sum_{i=1}^{n} [N_i C_i + (N_i C_i) N_{ЗП}], \quad (1)$$

where N_i is number of personnel performing tasks of the i-th type;

C_i is salary of the performer of the i-th type of work;

$N_{ЗП}$ is salary accrual (%).

It can be seen that in formula 1, overhead costs can be managed only through the number of management personnel.

Manual data entry into the computer continues the bottleneck of all existing information technologies. This operation is time-consuming, requiring certain skills and special attention from the operator at this stage the largest number of errors that distort the information is possible. This greatly increases the efficiency of the operator by using an automatic identification tool that provides almost instant data entry into the computer, while eliminating the distortion of information.

Indicators for assessing the rationality of information flow in enterprises.

As a motor transport enterprise, the object of management, among the number of specific features, we can distinguish: John's efficiency in the work of a number of external factors (climate, weather, roads) and related industries (suppliers of parts and materials, trustees, shippers, etc.); the production process of dynamism and stochasticity is relatively independent of both the production of divisions, the composition of activities departments, and the various services and administrative bodies of far away from territorial waters. These factors have a specific impact on the production management information support system [1].

The effective management of these objects should be based on a continuous and reliable flow of information about the environment from the inside of the change management system itself. Current information must flow to a specific level of the decision-making hierarchy within each level of competence.

The company offers two main services: technical (Chief engineer) and commercial (head of operations). The first is designed to ensure high availability of rolling stock, and the second-productive use. In addition, a number of departments directly supervise the report and serve as enterprises of all sectors (Planning Department, Accounting, Personnel Department, etc.).

Technical services that solve a certain range of tasks can not work normally without the flow of information coming from car maintenance services. Plan maintenance, manage the consumption of tires, spare parts and materials, you need information about you mileage, perform timely repairs of the car and prevent fuel costs, information about the necessary fuel consumption, and so on.

In turn, the operation of the service can be planned output of the car line, not the state of data about the car fleet, information about convenient cars, maintenance, repair, etc.). In other words, in the course of the work is an independent service, active data exchange, the need to conduct the creation of integrated information systems for managing the work of the enterprise.

Analysis of the management structure of the activity of the enterprise showed that the management of the reduction of the production process has the following functions: planning, accounting, analysis, control and coordination [2].

The parent transport company has set up production units (convoys, maintenance and repair areas, warehouses, sections) and services (accountancy, Planning, Technical departments, etc.), each solves a certain range of tasks.

The activities of the department are recorded in various documents (plans, schedules, summaries, reports, orders, requirements, etc.). Therefore, from this information, car transport enterprises flow more information than the entire movement and nothing more than documents in various forms.

Almost all documents consist of two parts: the explanatory part («header»), the informational part (the content of the document). Using the term DBMS, we can say that the description of the document contains part of a single record consisting of a field, that information is part of a sequence of uniform records consisting of the same settings of the field. Each field is characterized by a type (text, number, date) and a certain end length.

It should be noted that the document is divided into 3 types: normative, primary and secondary, depending on the type of information stored in it. The normative document is that the information in

the document does not change for a certain period of time (mileage maintenance, fuel consumption, standard part number, spare part cost, etc.). The basics store information («origin») that appears in the sector of the enterprise during production activities. Basic documents include waybill, repair request, material request, etc.

Secondary documents include various forms, statements, reports and summaries – everything that is the result of the analysis and processing of primary documents. In the future, the formation of the database structure of an information system is facilitated if a clear distinction is made between these types of data when studying information flows.

We can distinguish the following indicators for assessing the correctness of document flow: the volume of information processed (in a document, on a task, in a division, in an enterprise); the ratio of the volume of normative and reference, primary and secondary information; the degree of repetition of information (at the level of a document, task, division, enterprise); the complexity of data processing.

Indicators that can be used to quantify changes and the degree of perfection of the technologies used: the amount of information processed manually by personnel; the total amount of data in the database of the information system (for a certain period); the amount of current information entered into the database from the keyboard over a period of time; the amount of information transmitted through the communication channels of the information system.

In computer science, 1 bit of elementary unit information, i.e., element information, such as «Yes», «No» or 1,0. All information stored on the computer is in the form of binary code, while all letters or numbers can be encoded using a combination of the 8th ones (8 bits).

An element or cell consisting of 8 bits is called a byte (1 byte) in computer science. All this information is a series of characters (letters, numbers, dates) that are written in the document, and the amount of information in bytes that can be measured to them. In addition to bytes, larger units are used to estimate the volume of information flow – kilobytes (1 kilobyte), megabytes (1 megabyte).

The amount of information in the document can be found in the expression:

$$W_{\text{док}} = W_{\text{О}} - W_{\text{И}}, \tag{2}$$

where $W_{\text{О}}$ is scope of the description part of the document;

$W_{\text{И}}$ is scope of the information part of the document.

The volume of the descriptive part is determined by:

$$W_{\text{О}} = \sum_{i=1}^{n} W_i, \tag{3}$$

where W_i is the amount of information (bytes) in the i-th field of the descriptive part of the document;

n is the number of fields in the record of the description part of the document and the volume of the information part of the document:

$$W_{\text{И}} = N_{\text{З}} \sum_{j=1}^{n} W_j, \tag{4}$$

where $N_{\text{З}}$ is number of items in the information part of the document;

W_j is the amount of information in the j-th field of the information part of the document;

m is number of fields in a record in the information part of the document.

The amount of information used to troubleshoot the problem can be found using the following formula:

$$W_{\text{ЗАД}} = \sum_{i=1}^{N_{\text{Д}}} W_{\text{Д}i}, \tag{5}$$

where $W_{\text{Д}i}$ is the amount of information in the i-th document;

$N_{\text{Д}}$ is number of documents used to troubleshoot the problem;

The amount of information processed by the business unit can be determined by the expression:

$$W_{\text{ПОД}} = \sum_{i=1}^{N_{\text{З}}} W_{\text{ЗАД}i}, \tag{6}$$

where $W_{\text{ЗАД}i}$ is the amount of information needed to solve the i-th problem;

$N_{\text{З}}$ is number of tasks to be solved in the sector.

Finally, the total amount of information in the enterprise is determined by:

$$W_{\text{АТП}} = \sum_{i=1}^{N_{\text{П}}} W_{\text{ПОД}i}, \tag{7}$$

where $W_{\text{ПОД}i}$ is the amount of information processed in the i-th division of the enterprise;

$N_{\text{П}}$ is number of departments of enterprises.

The degree of duplication at different levels (documents, tasks, divisions, enterprise) is one of the important indicators of the rational organization of information flows.

Quantitative duplication of information, when the content of one document partially or completely repeats the content of another document, can be evaluated by two indicators: the degree and multiplicity. The degree of duplication indicates the proportion of document information that is contained in other documents that can be found at the document level from the expression:

$$S_{\text{Д}} = \frac{W_{\text{ДУБ}}}{W_{\text{ДОК}}} \cdot 100\%, \tag{8}$$

where $W_{\text{ДУБ}}$ is the amount of information that is repeated in other documents;

$W_{\text{ДОК}}$ is total amount of information in a document.

The multiplicity of duplicates ($K_{\text{ДУБ}}$) I s determined by the number of documents repeating the same information.

The degree of duplication of information at the level of work (department, enterprise) is determined by the formula:

$$S = \frac{\sum_{i=1}^{n} W_{\text{ДУБ}i}}{\sum_{i=1}^{n} W_{\text{ДОК}i}} \cdot 100\%, \quad (9)$$

where $W_{\text{ДУБ}i}$ is the amount of duplicate information in the i-th document (by work, department, or enterprise);

$W_{\text{ДОК}i}$ is the total amount of information in the i-th document (by work, department or enterprise).

The volume of NSI stored in magnetic media characterizes the degree of rationality of the database structure of the information system and can be calculated from the expression:

$$W_{\text{НСИ}} = \sum_{i=1}^{N_\Phi} \left(\left(\sum_{j=1}^{N_{\text{П}i}} R_j \right) N_{\text{З}i} \right), \quad (10)$$

where N_Φ is number of files containing regulatory and reference information;

$N_{\text{П}i}$ is number of fields in the i-th file record;

R_j is the size of the j-th field of the j-th file item;

$N_{\text{З}i}$ is number of entries in the i-th file.

The amount of current information entered into the database of information through the system keyboard to determine the degree of work through the employees of the current operation. This metric can be found in the expression:

$$W_{\text{ТЕК}} = \sum_{i=1}^{N_\Phi} \left(\left(\sum_{j=1}^{N^{\text{О}}_{\text{П}i}} R^{\text{О}}_j + \sum_{j=1}^{N^{\text{В}}_{\text{П}i}} R^{\text{В}}_j \right) N_{\text{З}i} \right), \quad (11)$$

where N_Φ is number of files that currently contain information;

$N^{\text{О}}_{\text{П}i}$ is the number of fields in the record of the i-th file, information that is entered by the operator via the keyboard;

$R^{\text{О}}_j$ is the size of the j-th field in the j-th file, information that is entered by the operator via the keyboard;

$N^{\text{В}}_{\text{П}i}$ is the number of fields in the record of the i-th file, the information falling from the classification Automatic information System;

$R^{\text{В}}_j$ is the size of the j-th field in the j-th file, information falling from the classifier;

$N_{\text{З}i}$ is number of entries in the i-th file;

The amount of information transmitted over a communication channel (local area network) can be found in the expression:

$$W_{\text{ЛВС}} = \sum_{i=1}^{N_\text{П}} \left(\sum_{j=1}^{N^{\text{В}}_i} W^{\text{В}}_i \right), \quad (12)$$

where $N_\text{П}$ is number of departments of enterprises;

$W^{\text{В}}_i$ is the amount of information in secondary documents that are not entered into the personal electronic computer in the i-th department;

$N^{\text{В}}_i$ is number of secondary documents in the i-th sector.

Depending on the ratio of volumes, norms and information reference, information stored in the primary and secondary databases, it is possible to evaluate the number of solutions without at least an amount of data to identify the type of work that is specific to the personnel of the workload, work is in principle impossible. The I-th type of information sharing can be determined from the formula:

$$D_i = \frac{W_i}{W_j} \cdot 100\%, \quad (13)$$

where W_i is normative and reference information, the amount of primary or secondary information (=1.3);

W_j is total amount of information in the database.

The complexity of data processing is determined by the expression:

$$t = \frac{W}{\Pi_\text{Р}}, \quad (14)$$

where W is volume of processed data (Kb);

$\Pi_\text{Р}$ is operator Productivity (Kb/hour).

Using this indicator, you can predict the intensity of labor (required of manpower) of a certain type of work (fill the main document, form the output form of input data on the keyboard, etc.).

Conclusions

Based on the above, we will summarize the information of the flow of car transport enterprises, the collection and movement of various documents, which can be divided into three groups: regulatory, primary and secondary. In the norm include reference data on the basic records of current activities information about the company's business units and specific celebrities (travel and repair fuel delivery list, etc.), contains the results of some processing of secondary-primary documents (statements, summaries, reports, etc.). The secondary document partially or completely repeats the contents of the primary document.

To assess the rationality of the document flow can be used, such as indicators of the volume of information processing, the degree of data replication, the ratio of norms and references between primary and secondary, the complexity of manual data processing, and so on. These indicators can be defined for a single document, a single task, a department or an entire enterprise.

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Автокөлік кәсіпорындарының басқару персоналы жұмысының тиімділігін арттыру

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Аңдатпа. *Мақалада автокөлік кәсіпорындарындағы есептік-статистикалық және басқару міндеттерін шешу технологиялары, басқару қызметкерлерінің жұмыс тиімділігін арттыру қарастырылады. Басқару міндеттерін шешу үшін электрондық-есептеу машиналарын (ЭЕМ) қолдану негізгі факторлар есебінен персонал жұмысының тиімділігін едәуір арттыруды қамтамасыз етеді: персонал жұмыс істейтін ақпарат көлемін қысқарту; ақпараттық ағындарды өңдеу жылдамдығын арттыру; ақпаратты өңдеу нәтижелерінің дұрыстығын арттыру. Басқару персоналы жұмысының тиімділігі ақпараттық ағындарды өңдеудің қолданылатын технологиясымен тығыз байланысты. Бұл әсерді сандық бағалау үшін ақпараттық ағындардың ұтымдылық дәрежесін бағалауға мүмкіндік беретін тиісті әдістеме мен өлшемдер жиынтығы болуы қажет. Осы мәселелерді шешуге арналған бұл мақала. Автокөлік кәсіпорнын тиімді басқару қоршаған жағдай туралы, басқарылатын жүйедегі ішкі өзгерістер туралы ақпараттың үздіксіз және дұрыс ағынына негізделуі тиіс. Ағымдағы ақпарат әрбір деңгейдің құзыреттілігі шегінде шешім қабылдау иерархиясының белгілі бір деңгейіне түсуі тиіс.*

Кілт сөздер: *басқару қызметкерлері, жұмыс тиімділігі, ақпараттық технологиялар, есептік-статистикалық және басқару міндеттерін шешу, автокөлік кәсіпорны, электрондық-есептеу машинасы, нормативтік-анықтамалық ақпарат, деректер базасын басқару жүйесі, ақпараттық ағындардың ұтымдылығын бағалау.*

Повышение эффективности работы управленческого персонала автотранспортных предприятий

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Аннотация. *В статье рассматриваются технологии решения учетно-статистических и управленческих задач на автотранспортных предприятиях, повышение эффективности работы управленческого персонала. Применение электронно-вычислительных машин (ЭВМ) для решения управленческих задач обеспечивает значительное повышение эффективности работы персонала за счет основных факторов: сокращения объемов информации, с которой работает персонал; увеличения скорости обработки информационных потоков; повышения достоверности результатов обработки информации. Эффективность работы управленческого персонала тесно связана с применяемой технологией обработки информационных потоков. Для количественной оценки этого влияния необходимо иметь соответствующую методику и набор критериев, позволяющих оценить степень рациональности информационных потоков. Решению этих вопросов и посвящена данная статья. Эффективное управление автотранспортным предприятием должно базироваться на непрерывном и достоверном потоке информации об окружающей обстановке, о внутренних изменениях в самой управляемой системе. Текущая информация должна поступать на определенные уровни иерархии принятия решений в пределах компетентности каждого из уровней.*

Ключевые слова: *эффективность работы, управленческий персонал, информационные технологии, решение учетно-статистических и управленческих задач, автотранспортное предприятие, электронно-вычислительная машина, нормативно-справочная информация, система управления базы данных, оценка рациональности информационных потоков.*

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