

THE ERP-SYSTEM OF PRODUCTION AND OVERLOADS OF SUNFLOWER-SEED OIL

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Summary. The ERP program complex ALPHA developed by us allows:

- To reduce essentially the losses of energy and materials.
- To improve the quality of a product.
- To optimize the physical flow of materials and manage the procure-to-pay business cycle – from self-service requisitioning to flexible invoicing and payment – with ALPHA software that supports ERP procurement and logistics execution processes.

Keywords: ERP-system, program complex, mathematical tool.

Introduction. Today the creation of technical systems consisting of large number of various equipment and devices demands new design approach. The software supplied to the world market does not allow determining the degree of efficiency of the given system at design. The existing software cannot determine and more so specify exact parameters of the best among possible systems [1, 2]. The result of correction of a single error in design (in symbolic cost parameters) at various stages production of preparation is the following:

Formation of requirements specification - 1;

Design study - 10;

Product model creation - 100;

Production tools design- 1000;

Tools of production - 10000;

Production of sample series - 100000;

Batch production - 1000000.

That's why it is very important to know the exact parameters of units and devices of system at the earliest stages of projects, to design the best system from the beginning and to set the best control modes of this system.

The methods of casual selection of parameters used today in program complexes for big systems cannot provide in practice the best system approaches. The automatic control systems of technological complexes created nowadays cannot determine not only the best parameters of work of a complex, but also a no-failure way of achievement of design conditions. The realization of modern requirements of reduction of design time and design costs and reuse of the collected information at design of the new products, provision of a product with necessary infotainment during all its life cycles is impossible without application of special design methods. These methods are realized by program complexes, which were called earlier Control systems of the Products Data (PDM-Product Data Management), VPDM (Virtual Product Data Management), CPD (Collaborative Product Development), CPC

(Collaborative Product Commerce), etc., and today they are positioned as cPDM (collaborative Product Definition management). Computer aided design systems have now got the resonant name of CAD and became the integral part of CAE and PLM (CAD-computer-aided design, CAE-computer-aided engineering, PLM - product lifecycle management).

But all these systems have one cardinal disadvantage - they cannot "design projects". In other words, they cannot help in answering the following questions at the earliest stages: how effective the offered decision is and whether the competitors can propose a better decision.

Quality of projects is still determined by experience, intuition and success of expert-designers. There is huge need to review the ideology of systems design on the market.

In spite of all the variety on the market of Control systems of the Products Data - PDM, VPDM, CPD, CPC, cPDM, CAD, CAE, PLM, the number of mathematical kernel of these systems is rather limited. The mathematical kernel of company Parasolid had the primary distribution. A kernel is a set of mathematical functions intended for securing the work of CAD/CAM/CAE/PLM. The designer gets access to the functions of the kernel through the user interface. The kernel determines the functions of CAE, productivity, result of work, i.e. the quality of design. But it is not enough to create only a good kernel; it is necessary to improve it constantly. The requirements to the kernel vary with time. They depend on many factors: a scope of solved problems and capacity of computers. The task of "Network solutions development Co. Ink." [1] create a tool i.e. a mathematical kernel (the symbolical processor) with such potentialities, which other processors couldn't achieve. However to create a new kernel it was necessary for "Network solutions development Co. Ink." [1] develop new methodology. The basic difference of the developed methodology is that it allows creating the best system, to specify the best characteristics and control modes without the use of traditional methods of operating parameters selection. The developed [1, 3] methodology has shown the buried reserve of systems accessible only at realization of the new approach based only on fundamental principles.

The program complex ALPHA developed by us allows:

1. To make the advanced design developments in less time.

To speed up the design as at design work there is no need to look for the best design solution.

2. To create products with set characteristics: efficiency, performance factor.

3. To reduce essentially the losses of energy and materials.

4. To improve the quality of a product.

5. To exclude system failures caused by redistribution of the resource in a random way.

6. To exclude mistakes at manufacturing application. It will not be necessary to test the details of technological modes on models, development types and pilot copies and to specify design solutions.

7. To guarantee competitive capacity of a designed system.

8. To offer not only the best systems, but also the best working mediums for

these systems.

9. To guarantee no-failure operating mode at change from one operating mode of the system to another one.

10. To reduce the time of new production arrival to the market (at manufacturing applications the stages of adjustment and operational development of products on pilot samples are excluded).

We have created the methodology of carrying out the tasks of the general theory of systems applied in various areas of technique. It is based on presentation of real object by interactive networks. The mathematical tool increases the reliability of the forecast of the state of systems, both at their creation and management. The basic advantage of the developed methodology is that it allows without the analysis of changes in the system at control actions to specify what these actions should be so that the system had the set characteristics. The application of methodology has shown the buried reserve, first of all of the economic contents. The existing environments of automated design or development of applications for industrial systems of lower level do not imply the analysis of a technical reliability of developed systems and installations. They are not intended to analyze how close the developed system is to the most economically worthwhile system and how much we need to spend on its improvement. Besides, the traditional optimization scheme for solution of such problems does not guarantee objectivity of system quality since it is based on the subjective appraisals of system parameters by the expert [1, 3].

The methodology developed by us can be applicable for the decision of tasks in many areas of knowledge. This methodology is applicable wherein the decision of the systems of linear equations or vector systems is needed. Speed of decision of the systems of linear equations with the use of our methodology considerably higher, than at the use of traditional methods.

Automatic control systems for technological complexes created nowadays cannot determine not only the best operating mode of a complex, but also no-failure way to achieve rated conditions.

On this basis we have created the methodological and mathematical software for the solution of problems of diagnostics, modelling, management, pre-design study, reconstruction and systems design.

ALPHA allows realizing efficient control of extensive networks. The basic difference from existing software products is in the definition of a small set of branches, change of parameters (for example, hydraulic resistance) that will cause the necessary change of system parameters in the whole. HEAT-NET allows making system calculation in a design mode.

As the mathematical tool is universal, there can be a lot of practical applications designed as original software products. The system of the automatic control (ALPHA part) allows to automatic monitoring and operates by the technological process. ALPHA includes a program complex, system of controllers, sensors and executive machineries. The universal principles of construction allow using ALPHA in the different branches of industry and agriculture.

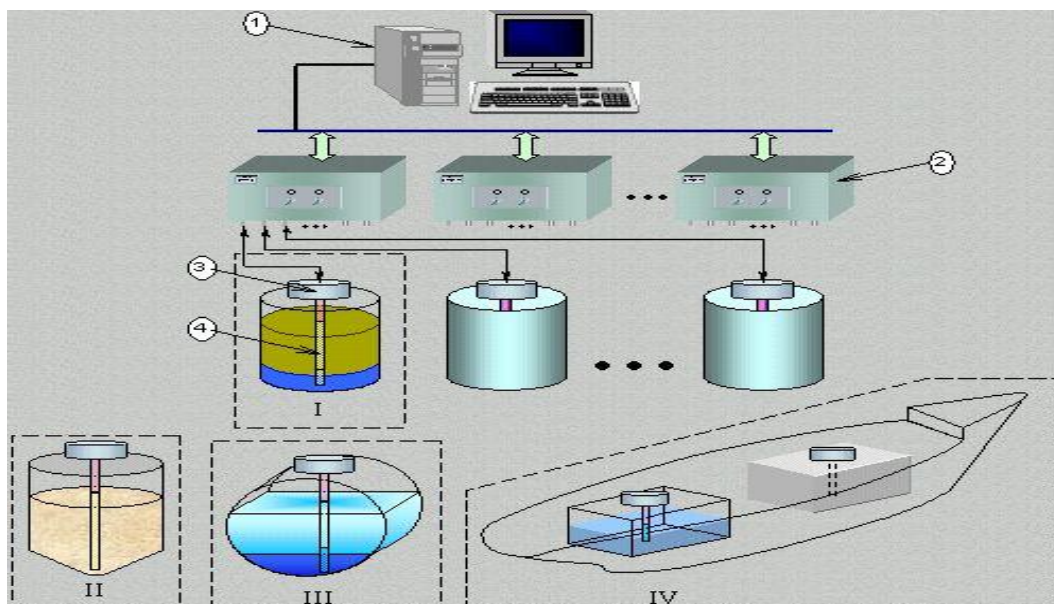


Fig. 1 The system of the automatic control ALPHA allows automatic monitoring and operates by the technological process

The ALPHA chart for storage and vacation of friable and liquid loads is shown on Picture 1: petroleum and mineral oil; corn and friable loads; liquid gas. The operator controls and operates by process by the personal computer (1). Signals of control and management are processed by the controller blocks (2). A block of preliminary treatment (3) of signals of sensors (4) is set near-by the object control and management. Measuring sensors and executive machineries (4) are set on object.

The programmatic complex ALPHA is intended for the operative control above work of the technological setting, collection and analysis of information about its work, for the management by setting and the uses as a trainer.

For comfort of user the field of screen is broken to parts (Picture.2).

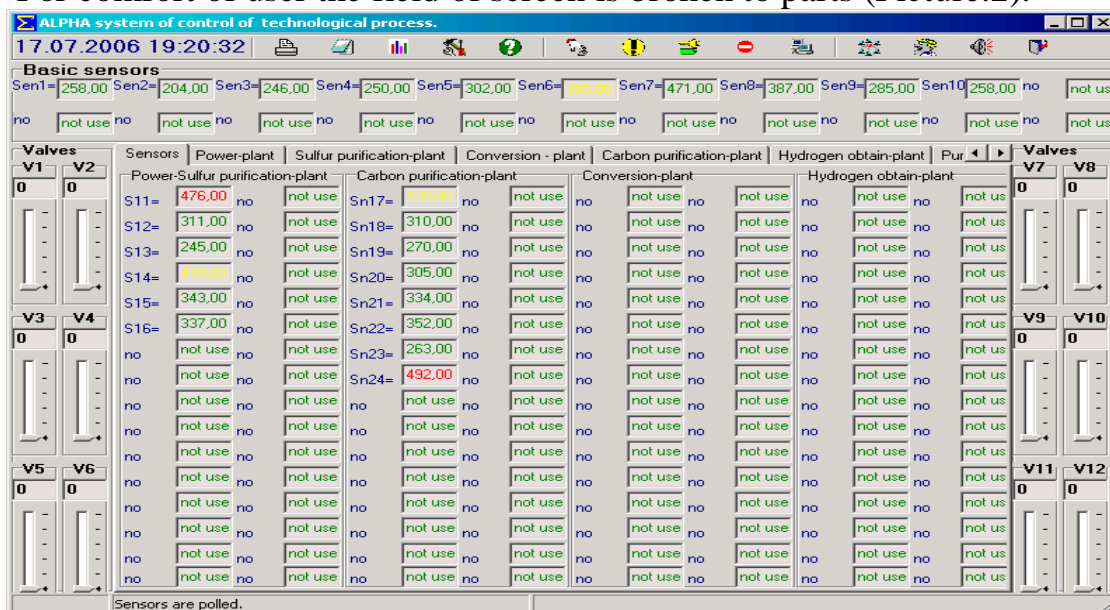


Fig. 2 Basic sensors screen

In left and right part of screen the groups of the buttons which regulation valves and/or exhaust/admission valves are located. In overhead are located the

buttons of the common setting and, under them, field for the conclusion of current values of the most essential sensors allowing conducting the continuous control above work of the technological setting. The book-marks, intended for switching on the windows of general chart of setting, charts of its separate blocks, log of current events and etc., are located in the center of screen.

A utility allowing to destroy on a screen in demand of (to the mouse click on the image of object) sketch is foreseen also /draft of this knot or good in composition setting. The buttons regulation valves are initialized by a mouse. The included being of the button is designated by the change of its color. In the case of receipt of signal about a failure the color of the handling button of valve will be replaced red. For the control by a valve it is necessary to bring a cursor to icon control and, either pressing the left key of mouse to “lead” sulky of valve of up/down or, using icon control of valve, to begin to handle him by scrolling. A percent number representing the extent of opening/closing of valve is given as in the window located next to his icon control, so in the window located next to his image on a chart in central part of screen.

Operator of the complex of automation of technological process, unlike his administrator can take advantage of only part of the offered utilities: viewing of the graphs of reading sensors changes from time, inclusions/disconnections of warnings window, stops to respond of sensors, commands of beginning of work of programmatic complex, of user registrations, initial tuning of work parameters – that is, only by the buttons of the first and second group (see Picture 2).

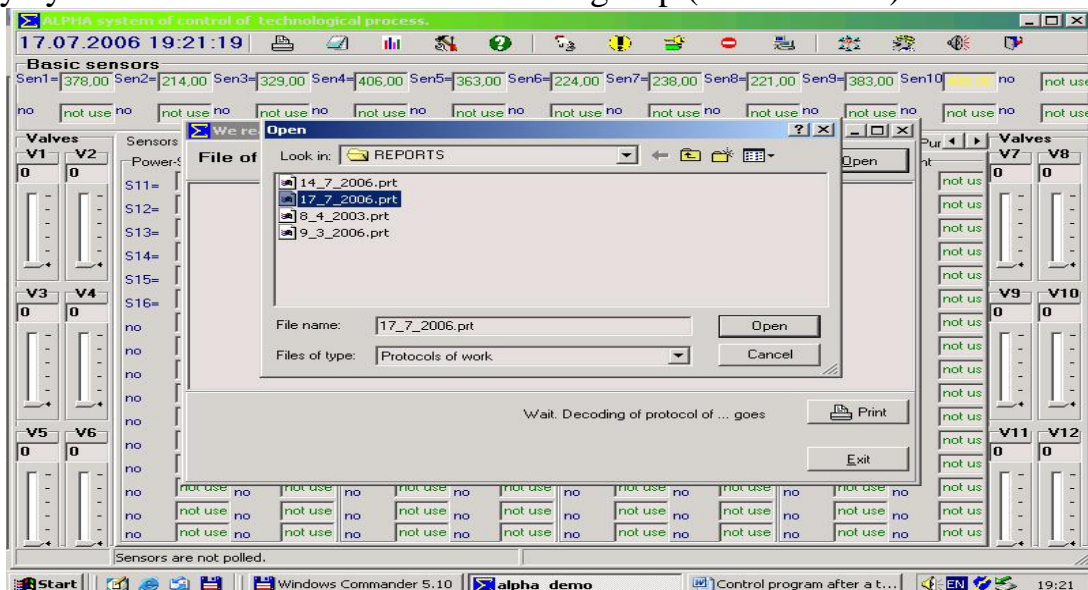


Fig. 3 This is the screen utility of logs opening

The utility of viewing work-logs (Picture 3, Picture 4) is intended for the operative viewing of logs of present and past periods of work.

For this purpose it is necessary in an appearing window we “Read the file of log” to initialize the button to “Open” and choose the file of log work setting for proper period.

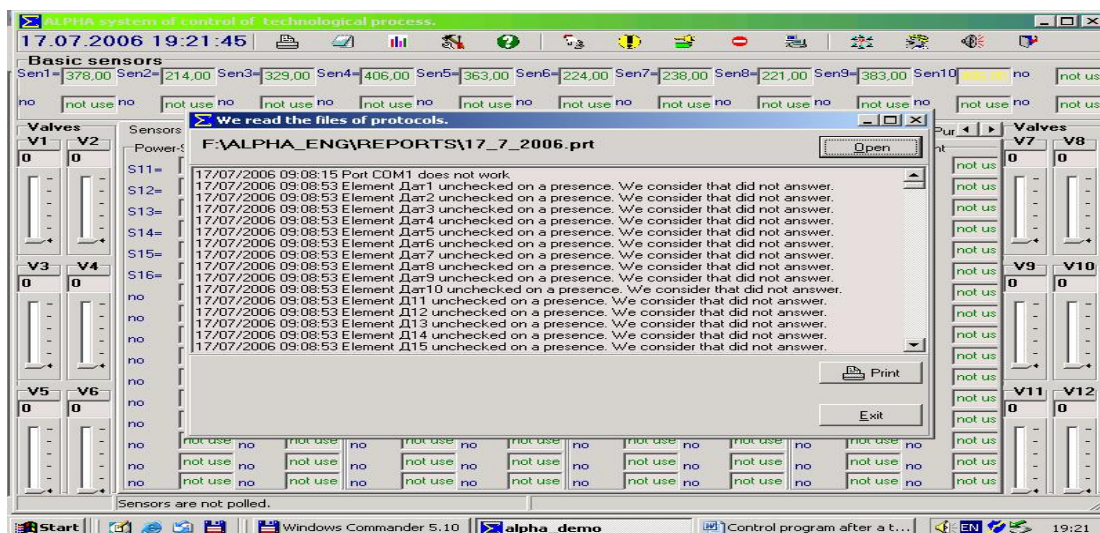


Fig.4 This is screen the utility of logs viewing

To choose for reading it is possible not only log from the current folder REPORTS but also from other folders, passing in them by the use of the standard utilities Windows. Except for it, it is possible to take advantage of the utilities “Review of desktop”, to “Create a new folder”, “Sorting of files at times creations ” or to look over the files of logs of work with pointing of their sizes, type, date and time of creation. A utility allows “Review of desktop” to pass to other disk, other directory, to other folder containing the file of log work the technological setting for any period.

For the transfer of log on paper transmitter the button “Seal”, located on the book-mark we “Read the file of log”, is foreseen. At unsealing of log pointing on a way (name of disk, directories and subdirectories), where a file for the seal is taken from, and also name of file will be a finishing line. It will allow decreasing the chance of falsification of log.

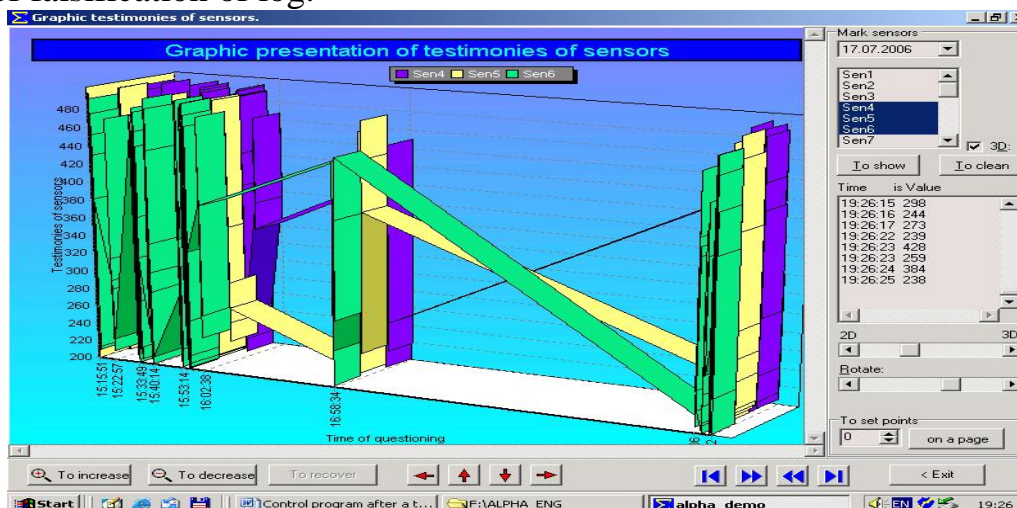


Fig. 5 This is the screen the utility handling viewing of the graphs of changes of reading sensors

A utility handling viewing of the graphs of changes of reading sensors at times are foreseen also (see Picture.5). For this purpose there is a menu in right overhead part of window - to “look over the graph”, in it will substitute there is a prompt “mark

sensors”.

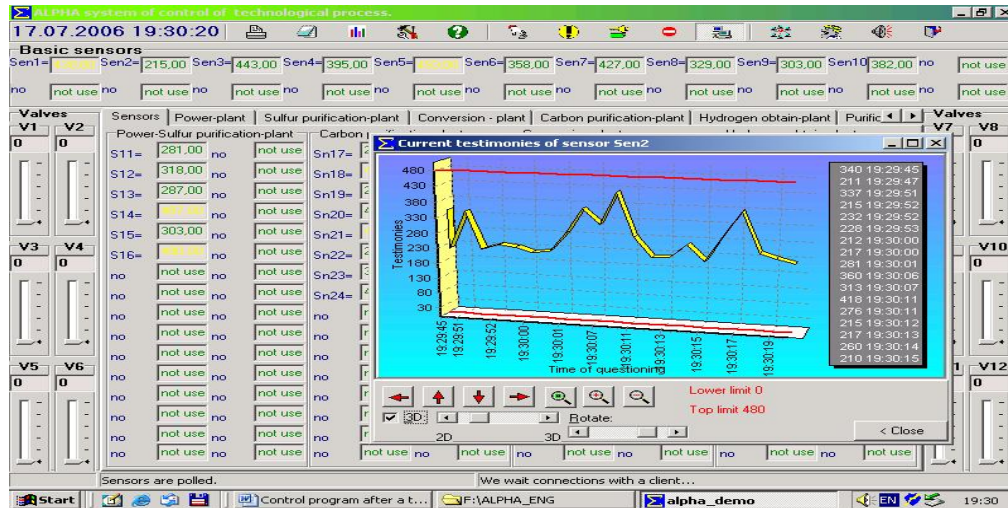


Fig. 6 This is the screen the utility handling viewing of the graphs of changes of reading sensor in the current mode («mode of plotter »)

In the menu “Date” it is necessary to choose a date for which it is necessary to look over the reading of sensors. It can bring this date into a present window, and it is possible to choose on a calendar from auxiliary menu. Further in a window subjacent, it is necessary to choose one sensor or their compact group, move a cursor from one to other sensor, simultaneously pressing the “Shift key”. If sensors in a list are located separately, in place of the “Shift key” it is necessary to take advantage of the “Ctrl key”. If it is necessary to pass to viewing of work of other sensor or their group, it is necessary to take advantage of the button to “clean”. To “Multiply” the keys, to “Decrease” are intended in order to change the size of the looked field after in the indicated co-ordinates. For comfort of perception of the graph the utility “Turn” - rotation of plane of the graph about vertical axis is developed. It is possible also to look over the reading of each of the most essential sensors in the «mode of plotter » (see Picture.6).

The utility of inclusion/disconnection of warnings window is intended for initialization of window warnings to the operator about accident situations hatch in which, assorted at times their receipts. Warnings hatch in a text kind by a red color.

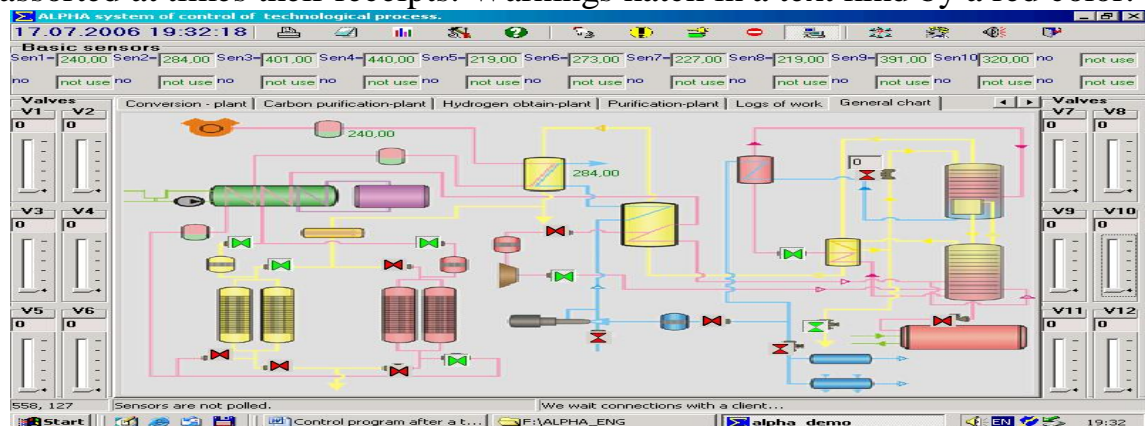


Fig. 7 This is screening the fields of charts of the technological setting and its blocks

An operator leafs over these warnings by scrolling. On the right of window in

which hatch text the report, the meter of the acting warnings is located – the number shined by a red color. If necessary it is possible to take advantage of the button to «Clean». Then the list of warnings will be closed. Cleaning the list of warnings is possible also by the repeated pressure of the button of inclusion/disconnection of window of warnings. Support of the Windows utility moving of window warning in the area of screen comfortable for an operator is foreseen also. The book-marks, intended for the reflection of general chart of setting, charts of its separate blocks, current events and presentation log of the current graph reading sensors changes from time, are located in the screen center.

On the fields of charts of the technological setting and its blocks the current values of reading sensors are taken away. The color registration sensor numbers will change to yellow and a preventive irregular signal under reaching the lower/overhead safely legitimate value of the measured size will simultaneously sound. If the lower/overhead maximum legitimate value of the measured size is attained color of numbers will substitute on red and the continuous signal of siren will sound.

All events, including cleaning of log of current events, are saved in the files of logs. Current events a date and time of happening event are registered also. The personal COMPUTER ALPHA supports also the utility translation of each of auxiliary window in waiting the mode. It facilitates of operator work on rapid transition from a window to a window, is special in accidents terms, and is ordinary related to the shortage of time. ALPHA is developed in the variant to be used both in local and global networks (see Picture7).

Conclusions. To optimize the physical flow of materials and manage the procure-to-pay business cycle – from self-service requisitioning to flexible invoicing and payment – with ALPHA software that supports ERP procurement and logistics execution processes. The program complex ALPHA can help reduce costs, regardless industry or company size.

Increase visibility into purchase orders, contract management, and invoice handling.

To reduce costs by lowering inventory levels and consolidating shipments

To maintain high levels of supplier and customer satisfaction.

To optimize basic business processes – from requisitioning to invoicing for simple procurement.

To improve processes of procurement from buying to shipment.

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АНОТАЦІЯ

Котенко С.В., Дьяченко О.П., Лопотан Л.В. ERP – система виробництва та відвантаження соняшникової олії

Спроектовано і створено програмний модуль ERP-системи перевантажень соняшникової олії з переробного заводу на корабель. Програмний комплекс контролює всі стадії процесу і веде точний облік напівфабрикатів і продукції на всіх бізнес стадіях - від оформлення контракту до відвантаження покупцеві.

Ключові слова: ERP-система; програмний комплекс; математичний інструмент.

АННОТАЦИЯ

Котенко С.В., Дьяченко А.П., Лопотан Л.В. ERP – система производства и отгрузки подсолнечного масла

Спроектирован и создан программный модуль ERP-системы перегрузок подсолнечного масла перерабатывающего завода на корабль. Программный комплекс контролирует все стадии процесса и ведет точный учет полуфабрикатов и продукции на всех бизнес стадиях - от оформления контракта до отгрузки покупателю.

Ключевые слова: ERP-система; программный комплекс; математический инструмент.