ISSUES OF DOCKER-MECHANICS WORK IN RUSSIAN PORTS

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The article shows retrospective review of the issues of docker-mechanics management in the Russian seaports as primary workforce for executing loading and unloading operations. The analysis of team forms of docker-mechanics work organization in the ports reveals the advantages and shortcomings of such management at the present stage of Russian economy development and functioning of the Russian seaports. Using the Queuing theory the author justifies reasonability of creation the docker-mechanics general resource base at seaport within the framework of the independent "labor" company.

Keywords: docker-mechanic, port management, resource, brigade form, team form, organization of labor, concentration of resources, labor company.

The increase of rate and efficiency of production, intensive use of acquired production capacity, improvement of economic management and mechanisms as well as to achieve further increasing of welfare of the Russian people should be considered as the main tasks of national economic development at the present stage.

Intensification of economic development is organically associated with optimization of all modes of transportation including individual organizationally isolated enterprises and other elements of the whole transport system in the country. Particularly, the efficiency of maritime transport largely depends on the well-coordinated and cooperated activities of its two main components: the transport fleet carrying out freight functions and sea ports which implement cargo transshipment from one kind of transportation to another and allow smoothing over mutually uneven work of adjacent transport modes.

Improving the organization of transport handling at ports first of all must include the development of the production process organization and management system. At the current phase of the domestic seaports activity in the dynamically changing freight traffic it is particularly important to balance the amount of work and port resources as well as to utilize available port resources efficiently. Primarily it relates to the workforce and mainly to the resource of docker-mechanics as the main category of workers directly involved in cargo handling process at port.

Port production system for its purpose and functions can be divided into the following subsystems: core, conjugate and supporting.

The core subsystem ensures the cargo handling process as the main substance of the production process. A chain of technological operations with the cargo from the moment it comes into the system and to the exit makes the nature of the system's production functions such as ships (vehicle) loading (unloading), goods transportation within port area, warehousing and storage.

Technical elements of the subsystem are: the port area with mooring quay, equipped with mooring facilities; the rail and road gridiron; the warehouses of various types; temporary anchorages outside port or in the harbor; shore handling installations (major and minor mechanization) as well as floating equipment (floating cranes, etc.) and internal transport means (vehicles, port fleet).

Subsystem's manpower is represented by the contingent of port workers, the majority among them consisting of docker-mechanics directly engaged in transshipment operations. Components of human resource management subsystem are: the organizational and production structure of the port; the structure of the labor team consisted of docker-mechanics, managers, administrators and operational staff; a set of methodological documents and regulations as well as other stuff to ensure the functioning of the subsystem and its components; a set of standards and determined parameters to ensure specified mode of operation of the subsystem. The workforce as well as other kinds of port resources is typically interchangeable with the development of various cargo that has a significant impact on resource requirements, and ability to maneuver them implementing transfer operations.

The main subsystem function is to perform cargo operations on the essential work areas such as servicing of vessel, wagons, and vehicles involving the existing technical and human resources. Sustainability of the subsystem is determined by the stability characteristics of incoming goods traffic and its processing by appropriate ship, wagons and motor flows.

Conjugate subsystem provides maneuvering, auxiliary and supply operations for vessel maintenance. Its separation as a subsystem is caused of the specific resources diversity and linkages with freight operations. Elements of the subsystem are the means of harbor fleet as well as working teams of specialists like seamen, pilots etc.

Supporting subsystem maintains the operational status of the port hardware. The nature of its production functions is determined by the rules of technical operation, providing the necessary technical maintenance and repair of transfer and reloading equipment. Structural elements of the subsystem include appropriate facilities and teams of servicing specialists.

Interaction between subsystems affects the whole transport system production process which includes a set of operations providing complete movement of cargo from one mode of transport. So, operations of the main subsystem (cargo operations) have two options to be performed: by a straight line (vessel-wagon, vessel-vessel, vessel-vehicle or vice versa) and by warehousing (ship-warehouse, warehouse-wagon, warehouse-vehicle or vice versa with temporary storage of cargo in the warehouse). In turn, cargo operation is divided according to place of work (the hold, truck, storage facility, etc.). Transshipment technology is characterized by main and auxiliary transshipment equipment as well as the number of employees engaged in the transshipment operation.

Time-dependant changes in conditions and indexes of freight operations show the dynamics of handling process.

Application for maintenance of a transport unit has its own operation structure depending on the list of available operations and type of required resources to implement them. Difference in the characteristics of planned freight flows and accidental phenomena of transport unit arrival are responsible for heterogeneity of the operating structure and requests flow and its unequal intensity in time. Thus, the port handling operations of vessels, wagons and trucks can be seen as functioning of the queuing system with randomly appearing heterogeneous applications.

Execution of the application in the core subsystem is provided by workers staff allocated for technological transshipment complex (TSC). In turn, the TSCs are the elements of larger organizational units such as the production transshipment complex (PTC) consisting of two or three TSCs, which also includes the docker-mechanics, managers, administrators and operation staff. The production transshipment complex here is either the port organizational department such as quay or group of quays (terminal) or a stevedore company, which being legally independent forms quantity and condition proposals through relevant port services.

In the Soviet period constant growth of freight traffic caused permanent workforce shortage. Therefore, fixed assigning manpower, first of all, docker-mechanics (DM) to the PTC gave a positive effect in terms of monitoring capacity of the port; controlled their use in processing a limited range of goods, but mainly for implementation of port's internal cost accounting system. Post-Soviet period is characterized by recession and then by alternating change of the freight turnover dynamics with a stable alteration in its structure. Under these conditions fixed assignment of docker-mechanics to PTC began to play negative role both in monitoring the preservation of balance between volume of work and workforce in port and in maneuvering these resources.

Seaport manpower is represented by different categories of workers. These include operational and administrative staff (supervisors and managers), engineers and technicians, docker-mechanics (workers employed in loading and unloading operations), warehouse workers (accounting personnel), maintenance workers (plumbers, electricians, welders, etc.), work-riggers (providing preparation of lifting gears, rigging and other equipment), merchant seafarers, port infrastructure support personnel.

The docker-mechanics category is the most numerous one among these categories of seaport skilled workers providing the main seaport functions implementation (loading and unloading operations (LUO). For this category of workers a permanent search for new forms of work organization and improvement of work management is conducted.

The main purpose of docker-mechanics work is the handling of ships, trucks and goods movement between warehouses. The substance of this labor is movement of goods within the specified work option (from the initial position of the cargo to a predetermined final position) with the use of various lifting devices, transport machines, load gripping devices (permanent or interim) enlargement of cargo spaces. Thus, nature of docker-mechanics work in the port defines the team form of labor organization. In turn, the team form of labor organization and payment develops the primary labor group that is responsible for completing a certain amount of work on the assigned object.

The smallest object of work for the team is processing line, which provides the implementation of operating procedure of goods transfer according a given scenario. A group of workers which supports one processing line during the working shift makes the smallest team of docker-mechanics.

The issue of docker-mechanics working forms development is useful to consider in historical perspective and as an evolutionary process.

Initially the team form of labor organization in the port was a gang (artel) of stevedores, inside which there was no difference in skills of workers. All stevedores performed the same work of cargo carrying. The number of workers in a gang was determined by the range of cargo relocation considering the condition that all members did not interfere with each other. An artel could be formed from a potential workforce, which is usually located outside the port. With the introduction of lifting-and-shifting machines in the port workers were divided into two groups: the movers and the mechanics (operators of those machines). Movers united in the reserve bases in the commercial port areas, and machine operators were assigned to the relevant units of the cargo area.

For the execution of reloading works movers and mechanics were forming temporary (one shift) initial labor groups - operational teams (OT) to carry out the necessary scope of services within a single processing line. For the time of work (shift) in each team a foreman was appointed as a rule from longshoremen.

As per increasing the number of port handling equipment using crew system with workers assignment to machines (a crew, providing around the clock operation of a machine), the category of mechanics became more numerous and their share among the workers of the main productive activity - more significant. Finally, the effectiveness of workforce use for loading and unloading was declining continuously. It was decided to organize composite teams (CT) of docker-mechanics. To do this all workers (machine operators and stevedores) were united to the general labor contingent with the appropriate skill qualification. Then all the workers were assigned to the teams with quantity equal to the average number of workers required to man one processing line, ensuring that each team has the necessary number of workers of various skill levels for all types of work. Workers were permanently assigned to the composite teams. In that case, the main condition for operations was the interchangeability of workers during the job, i.e. the worker had to perform primarily the work that was needed by team, and then the work as per his skill qualification. The composite team was permanent in structure and size as well as it was headed by a permanent team leader, who was being appointed by the port administration.

Creation of CTs reduced the total number of docker-mechanics with a constant amount of work. However, for all positive aspects of the composite teams functioning they could not ensure effective use of manpower. The problem of inefficiency was in inconstancy of the required number of workers for the processing line. Under these conditions, the fixed personnel number of composite teams meets the problem of workers shortage in some teams and an excess of workers in other ones.

The next step to improve the organization of team work at the port was creation of the enlarged composite teams (ECT). At the same time the object of work concept was being transformed. The object of the work was considered to be the whole vessel as well as list all of works within framework of the cargo handling complex. Thus, the number of enlarged composite team should suit to provide whole vessel processing during one work shift (horizontal integration). Large total number of ECT members would allow more effective workforce maneuver while processing lines formation, breaking the psychological barrier of worker assignment in a small team.

ECTs were being created on continuing basis. In the process of carrying out the work ECT could be divided into operational units (similar to CT) to serve specific processing lines. ECT was led by the appointed team leader who sometimes was released from work. Such sub-units as sections were under command of temporarily appointed section leaders just for the duration of newly formed processing line.

The creation of ECTs allowed more efficient use of docker-mechanics labor. However, several negative aspects in relationship between the initial (basic) labors collectives of the port appeared quite soon. The creation of ECTs coincided with the transition to an active form of lump-sum payment system (based on payment for the final result). That fact aggravated the situation related to remuneration of labor. Such issues may include: dependence of the results of the regular team (section) work on the quality of the previous team work; difficulty to establish the exact amount of work in different shifts while processing ships with bulk cargo.

As a result of those shortcomings between ECTs of different shifts some serious friction had been started. The heads of various levels of port administration had to investigate and solve the consequences of it. To fix the problem the port management applied well-known technique of imposing the issue on the shoulders of those who created it. It was again suggested to change the object of labor. Instead of a vessel processing for one shift they began considering as the object of work the whole vessel processing from A to Z. Accordingly, the number of team members supposed to deal with that specified amount of work. That team could be composed from merging of four (to provide round the clock continuous operation) ECTs (so called vertical combination).

Such newly created teams were called End-to-end Enlarged Composite Teams (EECT). They were created on an ongoing basis. EECT was headed by an appointed team leader who was released from work. EECT-ECT shifts were leaded by appointed permanent shift supervisors. Sections to serve processing lines during one shift were allocated efficiently. ECCT is the largest working team form of labor organization in the seaports. Further development of human resource management in port is connected with the management of human resources in general.

When there was the unification of machine operators and stevedores, the machine operators were removed from the jurisdiction of appropriate mechanization units and small garages and transferred to the general freight-area manpower reserve. From the general manpower reserve the permanent combined teams were formed and then left in the general manpower reserve of freight areas. Now in the process of working objects and manpower assignment for serving the processing line a whole team (CT) was allocated. The same procedure was being applied while working with ECT or EECT. Docker-mechanics from CTs were assigned to ECT and EECT, which also remained in the general manpower reserve. Manpower distribution of a large working team between objects of work was carried out by team management.

The next major step in the development of the mechanism of port human resource management was creation of production transshipment complexes (PTC). The PTC creating concept was the result of further development of internal self-financing. Prior to that, the port internal self-financing in the main activity was accomplished only at the level of the freight loading area. However, that procedure poorly achieved its main objective to increase workers interest in the final results of the unit activity. Therefore, to improve the effectiveness of internal self-financing it became necessary to create smaller size units in which the ties among employees as well as between employees and the results of the unit's work would have been closer. This division became the production transshipment complex which combined the material and technical base of 1/3 of PTC and the labor collective, including one EECT, administrative and management branches of PTC, temporarily supervising and warehouse personnel.

Creation of PTC allowed seaports to overcome the period of 'perestroika' relatively easy and to enter into market economy age. However, the overall production decline in the country and the decrease in of sea trade ports activities showed the lack of fixing the workforce for relatively small primary structural units. During insufficient volume of work in ports the amount of port manpower at PTCs became more than it was necessary. "Smearing" of the general surplus of resources between PTCs and relatively strong positions of docker-mechanics in PTCs (because they were the majority of the working force) did not assist to their timely reduction. Rapid transfer of manpower between PTCs to increase intensity of vessels processing was difficult because of psychological non-readiness of docker-mechanics. Conversion of PTCs to stevedore companies did the process of human resources exchange even more complicated due to insufficiently developed economic relations mechanisms.

Further research in the field of port human resource management forms led to the conclusion that the docker-mechanics should be removed from the PTCs. And the problem of efficient use and timely reduction of manpower should be imposed on labor collectives. This idea was implemented in some commercial sea ports in Russia.

Docker-mechanics were removed from all PTCs and united in legally independent so called "labor" companies. In the labor companies (TLCs) stevedores were merged into a general pool of labor resources without permanent fixing in teams of different types. If necessary, loading and unloading operations at the request of PTC and stevedore companies could be done by operational enlarged combined teams (OECT) of necessary manpower quantity, which formed from docker-mechanics of the general workforce reserve. If necessary, OECT could be divided into sections with the appointed leaders. Balance in use of human resources ensured by using rotation mechanism. Evolution of the team forms of work organization at seaports is shown in Figure 1.

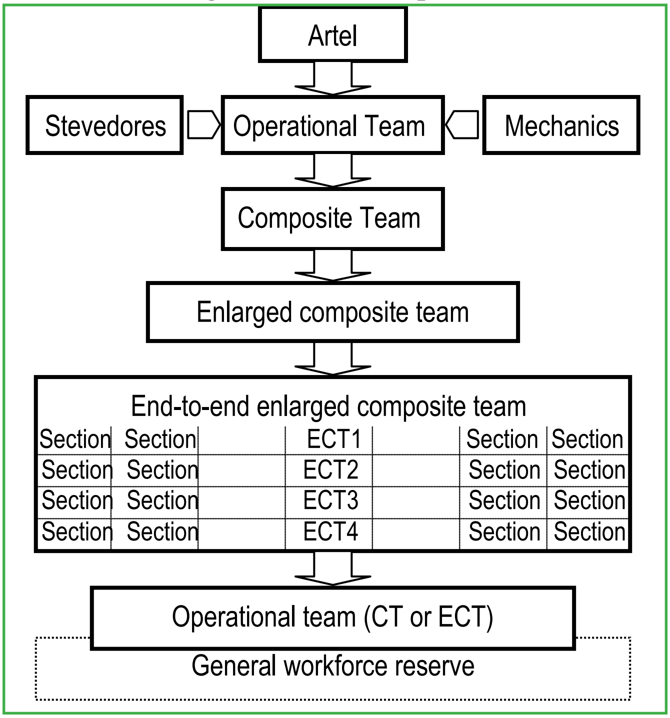

Figure 1. The general sketch of seaport team labor organization development

The latest developments look like the return to earlier forms of human resource management in the freight handling area. The workers are united in a common working collective; operational teams are being assigned for cargo handling; the main port dispatch office conducts operational management of workforce. However, it is only at first glance. In fact, a return to earlier forms occurred at a new stage of dialectical development, i.e. at a new qualitative level.

The following differences from the previous forms of management are worth noting.

1. The reserve of workforce is now a legally independent company which is completely self-financing. All conflicts within the

labor collective as well as issues of enlargement or reduction of the workforce must be solved by the manpower and the leaders. Concerns about keeping the excess share of workforce are also laid on the labor collective and its management.

2. The relationship between ports, stevedore companies and the labor companies are based on the trilateral commercial contracts (or contracts on joint activities). If it becomes necessary to perform a certain work a stevedore company submits an application for work execution in the port dispatch office. The dispatch office compares all requests with available labor resources in the labor company. If the manpower is sufficient, port dispatch sends all applications to the labor company. In case of insufficient resources the applications must be adjusted to the number of available workforce and then sent to the labor company.

3. The labor company has no division on the stevedores and machine operators. All personnel are docker-mechanics of appropriate qualification level.

4. At the request of the stevedore company an operational common combined team or operational enlarged combined team of docker-mechanics which must provide full range of work and interchangeability of working personnel.

As mentioned earlier the port human resources include various categories of workers. The docker-mechanics occupy a special place among the entire strength of port workers. This category of port workers provides and determines the effectiveness of transshipment operations as the main activity of the port. Therefore speaking about the labor force (here and further) we mean the contingent of docker-mechanics.

In general, the manpower resources management process in the port includes sufficient amount of procedures that can be grouped by functions and the managing period (see Table 1).

The Group of basic procedures in the Table 1 is highlighted in bold.

- Determination of manpower requirements for docker-mechanics (Planning);
- Distribution of docker-mechanics per shifts (Organization);
- Development of shift schedule (Planning);

<table>
<tr><th colspan="2">Functions / Period</th><th>Planning</th><th>Organization</th><th>Accounting, monitoring, analysis</th><th>Regulation</th><th>Motivation</th></tr>
<tr><td colspan="2">Perspective</td><td>Assessment of manpower (DM) requirements</td><td rowspan="2">Recruiting</td><td>Analysis of manpower use in the previous period</td><td>Adjustment of measures taken to meet the requirements in DM</td><td>Development& implementation of wage&labor stimulation system</td></tr>
<tr><td colspan="2">Current</td><td>Adjustment of manpower requirements</td><td rowspan="2">Accounting for actual availability and use of DM</td><td rowspan="2">Adjustment of measures taken for DM qualification</td><td rowspan="2">Adjustment of wage& labor stimulation system</td></tr>
<tr><td colspan="2">Calendar</td><td>Preparation of DM shift schedule</td><td>DM shift allocation</td></tr>
<tr><td rowspan="4">Operational</td><td>Month</td><td>Vessels processing planning</td><td>Implementation of recruiting demands and DM qualification requirements</td><td>Accounting and analysis of DM use</td><td>Adjustments in DM demands</td><td>DM wage calculation</td></tr>
<tr><td>Decade</td><td>Transport means processing scheduling</td><td>Preparation of proposals how to adjust working schedule</td><td>Correlation of both schedules of DM work and transport means arrival</td><td>Adjustment of DM working schedule</td><td rowspan="2">Collecting of salary documents</td></tr>
<tr><td>Day</td><td>General DM assignment to the objects of work</td><td>Preparation of applications for DM allocation</td><td>Enlarging the database of DM use</td><td>Adjustment of applications for DM allocation</td></tr>
<tr><td>Shift</td><td>DM assignment to PTCs</td><td>DM teams formation and allocation to the working places</td><td>Accounting of DM work by shifts</td><td>Adjustment of DM assignment by objects of work and teams</td><td>Data preparation for salary calculation</td></tr>
</table>

Table 1. Structure of docker-mechanics (DM) management procedures.

- Shift schedule adjustment (Control);
- Distribution of the whole strength of docker-mechanics per objects of work (Planning);
- Origination of applications for the workforce allocation for the handling operations (Organization);
- Docker-mechanics assignment to the processing lines (Planning);
- Formation of docker-mechanic teams and placing them at the objects of work (Organization);
- Docker-mechanics labor hours tracking by shifts (Accounting, control and analysis);
- Recording of actual availability and use of docker-mechanics (Accounting, control and analysis);

- Development and application of the payment and labor stimulation system (Motivation);
- Wage calculation (Motivation).

Main procedures require special scientific and methodological support. The group of previous procedures is highlighted in the Table 1 in bold italic. Its purpose is to prepare the environment for basic procedures implementation. For example, the development of transport means processing plans prepares information for the assignment of docker-mechanics to the objects of work.

The remaining procedures are concomitant and by nature serve as milestones. To implement these group procedures a routine approach is typical.

The analysis shows that the effective functioning of seaports is hampered by a number of unsolved issues of docker-mechanics resource management. These issues are the following:

- organizational forms of docker-mechanics assignment to the primary unit;
- implementation of the team form of docker-mechanics labor organization;
- reasoning for the optimal strength of docker-mechanics for the port in general or for some port's areas as PTC groups or stevedore companies;
- creation of docker-mechanics management methodological support in the labor company and interaction between the labor company and the users of docker-mechanics labor (PTC or stevedore companies).

The idea of docker-mechanics exclusion from the control of PTCs and stevedore companies and consolidation in the independent labor company to create the general docker-mechanics resource has not received sufficient theoretical justification yet.

The docker-mechanics strength optimization for the port is directly related to the issue of assignment of docker-mechanics to the primary port unit. The fact of the matter is that the number of EECTs assigned to the PTC provides a certain level of intensity of vessel processing by the number of used processing lines and the required number of workers in a processing line. Under these conditions the optimization of the port docker-mechanics contingent requires increased resource of docker-mechanics for the vessel processing planning, which is difficult because of the previously mentioned reasons. Moreover, the methodology of docker-mechanics optimization requirement itself needs adjustment and modernization.

Attempts to create the independent general purpose labor companies in the ports which would allocate docker-mechanics to on-demand users (i.e. PTCs or stevedore companies) have shown the lack of methodological support of their activity. In fact, the labor companies have assigned EECTs at the request in full force because docker-mechanics in a labor company continue maintaining the same team structure. The request itself indicates only the general need for docker-mechanics.

To improve the efficiency of docker-mechanics resource use, as per author's opinion, it is necessary to renounce permanent fixing of docker-mechanics in the teams and turn to the general reserve of the docker-mechanics. The main issues that need further methodological support are the following:

- changing the form and structure of the application for docker-mechanics allocation;
- developing a mechanism of at-request forming of the operational docker-mechanics teams of different forms (single, enlarged, end-to-end) considering specific labor and in compliance with social conditions;
- development of a framework of economic cooperation between the labor company and the users (PTC and stevedore companies);
- development of basic docker-mechanics work accounting and analysis system.

The most important task among mentioned ones is to make grounds for choice of docker-mechanics assigning form in the primary unit (PTC or labor company). Effectiveness of other tasks depends on the results of solving the first issue.

According to the author, the problem of justification of the effectiveness of the labor companies creation should be considered by the specific example. As the example we have taken a group of stevedore companies of the Vladivostok seaport with equal opportunities for the development of freight traffic by universal interchangeability of the berths (PTCs) and almost similar specialization of docker-mechanics assigned to them. This group of stevedore companies formed the relatively geographically isolated port area. The scheme of processing freight flows by the group of mentioned companies is shown in Figure 2. It should be noticed that the conditions of berths and docker-mechanics interchangeability are compulsory for the labor company formation and its workforce use.

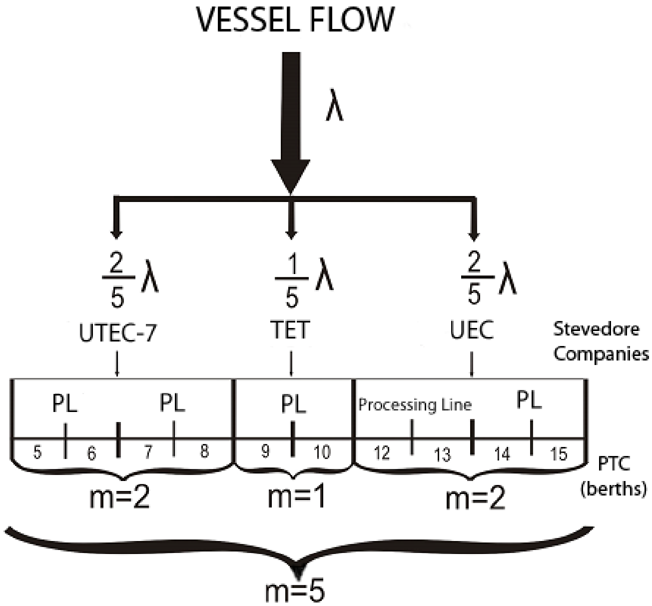

Figure 2. Distribution of vessel flow between stevedore companies and port's PTC.

Legend. λ – intensity of vessels flow to the port assigned area; m – number of simultaneously processing vessels (determined by the norm of transshipment complexes and equal to the amount of EECTs assigned to the port sector).

We can notice the following mathematical formulation of our issue (see Figure 2). In that case, if all port human resources are concentrated in one labor company then we have a mass queuing system with a certain number m of servers (i.e. docker-mechanics EECTs). The ship request flow enters in this system (i.e. part of the port area). If at the time of ship arrival the labor company has at least one idle docker-mechanics team (EECT) then the ship proceeds for processing immediately no matter at which PTC and berth it is processed. If all the teams are busy the newly arrived ship enters the queue and waits for the idle EECT to be processed. If each of the port PTCs has its own docker-mechanics contingent it is considered as the separate mass queuing system. For mass queuing systems with idle feature the main characteristic of quality processing is the duration of delay until the processing request. Accordingly, the characteristic for the above mentioned issue is the duration of ships delay at the port awaiting her queue for processing. When comparing the options for labor resources allocation in the port the best choice in fact should be considered as the #1, that ensures the shortest average ship delay duration prior to processing while the other parameters being equal.

So, finally we need to choose one of two options: to assign the docker-mechanics teams to the specific port PTCs or to concentrate whole workforce from the part of the port area in the labor company. Using the known formulas of the Queuing theory the author and his graduate students have calculated the results shown in Figure 3.

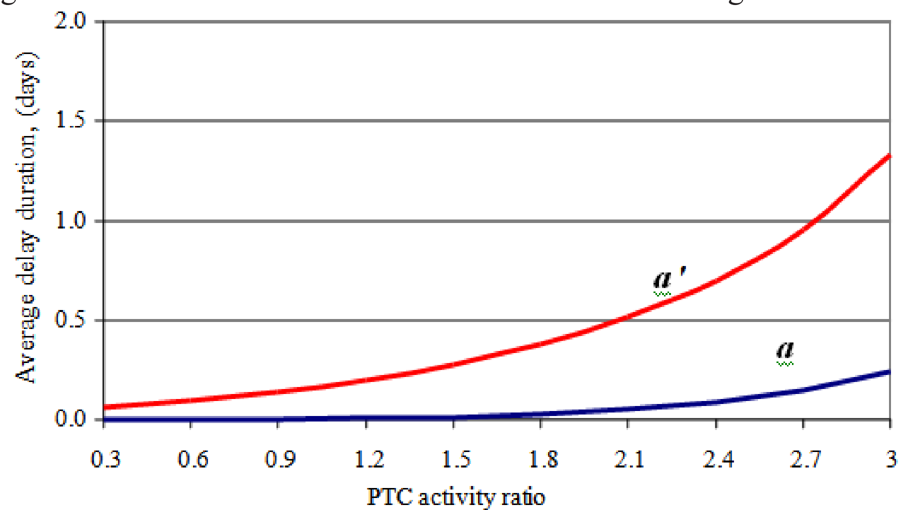

Figure 3. Delays of vessels waiting the processing with two options of workforce assignment in the port.

Legend. α – dependence of vessels delays from processing lines for the labor company; α' – dependence of vessels delays from processing lines for the group of stevedore companies with assigned workforce.

As can be seen from Figure 3, for any value of the port activity ratio the ships delays will be significantly less if the port would have at least one labor company than if each of the three port stevedoring companies would have its own human resources. Moreover, the higher the occupancy of stevedoring companies' berths, the higher the reduction of delay duration made by the labor company. This conclusion is valid for any option of the docker-mechanics labor collective consolidation.

This raises the following question. How many EECTs could be reduced in the labor company that the average vessel delay duration till processing would not exceed the one for the case when all three port stevedoring companies using their own workforce? To answer this question we will calculate the average duration of vessel delay when the number of EECTs in the labor company is less than 5 (m <5). The results are shown in Figure 4.

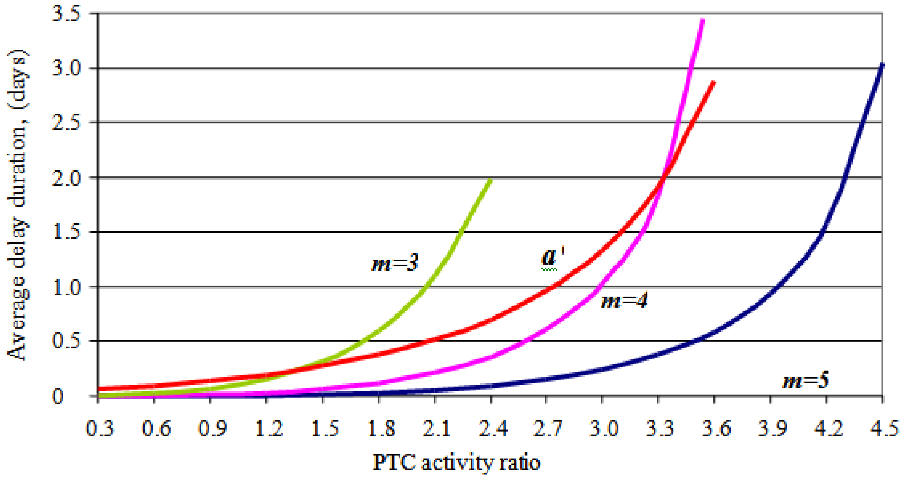

Figure 4. Average delay duration for processing with teams reduction in the labor company.

Legend. m – dependence of vessels delay duration from processing channels occupancy for the labor company (m = 3, 4, 5); α' – dependence of vessels delays from processing lines for the group of stevedore companies with assigned workforce.

As can be seen in Figure 4, if the berths occupancy ratio ρ is smaller than 3.3 (ρ< 3.3) then the reduction of docker-mechanic teams in the labor company from 5 to 4 does not increase the vessels delay duration in comparison with the vessels delay time in case of EECTs assignment to the port areas. In other words, four teams of docker-mechanics if they are concentrated in the labor company with the same amount of work can replace the five teams assigned to the stevedore companies separately. However, as can be seen in Figure 4 if the berths occupancy ratio ρ is higher than 3.3 (ρ> 3.3) and m = 4, the above effect suspends. The vessels stay duration starts racing up and becomes significantly higher than the similar index α' corresponding to the case where each of the three considered stevedoring companies has its own workforce. For more detailed analysis let's find the average loss of time for vessels which have come to the processing facility with fewer number of teams: m = 5, m = 4, m = 3. The results are shown in Figure 5.

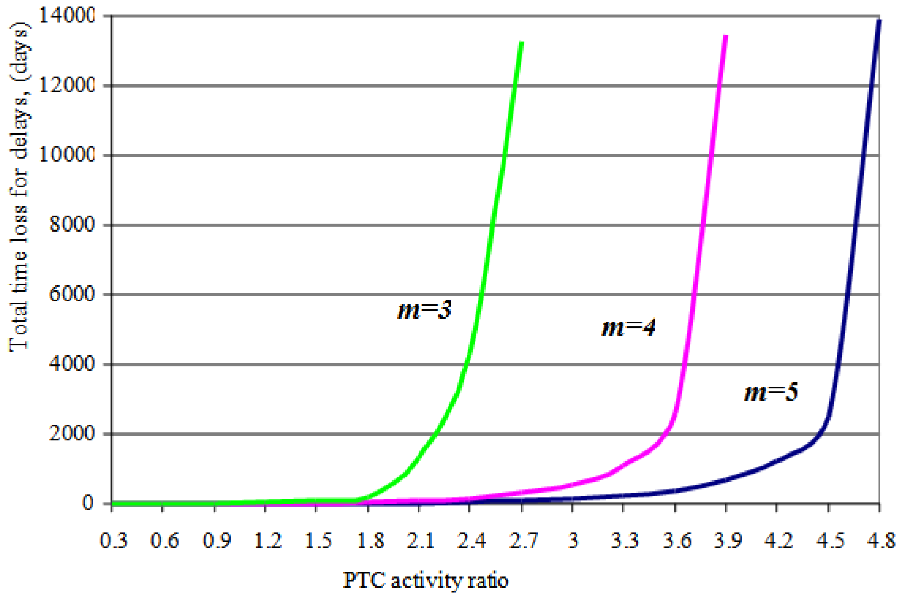

Figure 5. Average delay duration of vessels waiting for the processing with teams reduction in the labor company.

Thus, as it is shown in Figure 5 the fewer teams involved, the higher delay duration. The final conclusion about the provision of the labor company with docker-mechanics teams can be done only after the economic calculations.

Conclusion.

- Creation of the labor company reduces the delay duration of vessels waiting for processing in comparison with docker-mechanics assigning to each stevedore company (or PTC) with constant strength of docker-mechanics.
- Reduction of docker-mechanics EECTs in the labor company without special justification can be done only till the moment of vessels delay decreasing before processing. Further EECTs reduction can be done after special economical study only.

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