

ESTIMATION OF LOSS OF WORKING HOURS IN MANAGEMENT OF THE HUMAN RESOURCES OF THE CONSTRUCTION SITES IN BULGARIA

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Abstract

Despite the implementation of different methods and software for construction management in our country, the human resources management at the construction site is not given the necessary attention, which is why the losses of working time within the construction processes reach a high percentage.

Human resources management at the construction site is a decisive factor for the successful completion of construction projects within the specified deadlines and in accordance with the required quality.

In the present paper, the factors that lead to loss of working time in the execution of similar construction processes within selected model construction sites in our country, are examined and analyzed.

The aim is to identify the problems of human resources management at construction sites, as well as to propose approaches for reducing the loss of working time, respectively for increasing the productivity of labor under certain production conditions.

Keywords: labor productivity, factors, human resource management, construction site, loss of working hours

1. INTRODUCTION

The construction sector is fundamental to economic development, demographic growth, social development and ensure higher standard of living in a country. Therefore, it should pay attention to improve, reform and modernize its current state.

The workforce is one of the strongest strategic assets for increasing the competitiveness of a construction organization, but at the same time it turns out to be the most complex resource to manage (Malkani, Kambekar, 2013). With the effective and optimum uses of rha workforce, all the advantages supplied by the productivity growth can be obtained (Attar et al.). However, to this day, the construction industry still faces a number of problems in terms of poor productivity, lack of healthy and safe working conditions, low quality.

Numerous scientific studies show that despite the application of various methods and software products for construction management and human resource management, on the construction site insufficient attention is paid, due to which the loss of working time reaches a high percentage of the work shift. It turns out that only 30% -40% of the working day is used for the main construction activity, and in the rest of the time the delivered materials are accepted and transported, the construction site is cleaned and rearranged, equipment is sought, labor discipline is violated, etc.

Observations on the construction sector in our country show that a large percentage of construction companies fail to complete the projects according to the contract completion date, within the budget or with the required quality of construction work, which is largely due to lack of sufficient number of skilled workers. This statement ultimately remains unclear because it lacks specificity - what qualities are missing in the workforce, what specialties are sought, what categories of construction the statement refers to, etc. (Risk Analysis Foundation, 2008) Many construction companies see the need to optimize the work process and try to find effective ways to reduce the loss of working time and increase the productivity of construction workers. This proves the need for further research and introduction of new innovative methods and approaches for their management.

In this regard, the purpose of this report is to identify the problems of human resources management at construction sites, as well as to propose approaches for reducing the loss of working time, respectively for increasing the labor productivity under certain production conditions.

2. RESEARCH METHODS

The first step to optimize the construction work process and significantly reduce the loss of working time in construction is to make an extensive study of real, but different in size, location and complexity construction objects.

To achieve this goal, 10 model construction objects were studied, which were selected according to the following criteria: company category, site size, number of workers on the construction site throughout the construction phase, use of resource management software, degree of manufacturability, way of identifying losses of working time, etc. The construction sites are located on the territory of 4 large cities in our country and their total built-up area is from 2000 m² to over 10,000 m², and they perform residential construction at different stages: rough construction and finishing works. At each construction site, a reduced labor productivity has been established in advance, and hence the lag of the construction of the site from the initially set deadlines in the developed project schedule.

Based on a study of literature sources in the field of human resources management on the construction site, as well as examples from world practice, two questionnaires have been developed, one of them is targeted at the management staff of construction companies and the other at construction workers, working on their sites. At the selected model construction sites, a total of 80 people were interviewed in the working environment. The construction workers are working with an employment contract in the construction organizations.

The questionnaires contain detailed questions related to the work experience, skills and qualifications of the construction workers; opportunities for professional development; ensuring healthy and safe working conditions; ensuring effective communication at different levels of site management; working conditions, including duration of the work shift and the working week; providing a suitable working environment; motivational factors influencing labor productivity; problems with work organization on the construction site, leading to loss of working time, bad habits, etc.

In this article we consider only the results obtained from a survey of construction workers on model construction sites.

3. RESULTS AND DISCUSSION

As a result of the questionnaire survey of 80 construction workers from the model construction sites, it is clear that the factors that affect labor productivity, and hence the loss of working time, can be systematized into 4 groups, namely: management related factors; technical resource related factors; human/labor related factors and technical related factors.

Table 1 shows the first group of factors depending on their appearance and the consequences that arise from them.

Group of factors related to the management		
№	Factors	Manifestation and consequences
1	Lack of effective communication between human resources	Misunderstandings, dissatisfaction, stress, unclear tasks, lack of feedback between human resources in the organizational structure of the construction company and etc.
2	Lack of incentive program	Insufficient or missing motivation for work, Labor discipline violation etc.,
3	Lack of coordination between human resources on the construction site	Misunderstandings, dissatisfaction, a lack of workplace flexibility and balance and creation of uncomfortable or dangerous working zones etc.
4	Lack of supervision on the construction site	Labor discipline violation, waste of construction materials, theft of tools
5	Untimely control over the implementation of the construction program	Delay in the deadline for execution of works, breach of contractual terms, changes in the schedule for delivery of materials and others.
6	Unclear or delayed safety and health instructions	Failure to comply with measures for healthy and safe working conditions, occurrence of accidents or occupational accidents, violation of labor discipline
7	Lack of labor training	Lack of skilled labor, inability to develop human resources, insufficient or missing motivation etc.

Table 1. Group of factors related to the management. Manifestation and consequences that arise from them.

According to the respondents, the 8 factors falling into this group with the most significant impact on labor productivity include the lack of communication (This factor is ranked first by 20 workers) and the lack of motivation and incentive programs (from greatest importance for 17 workers) (Fig. 1).

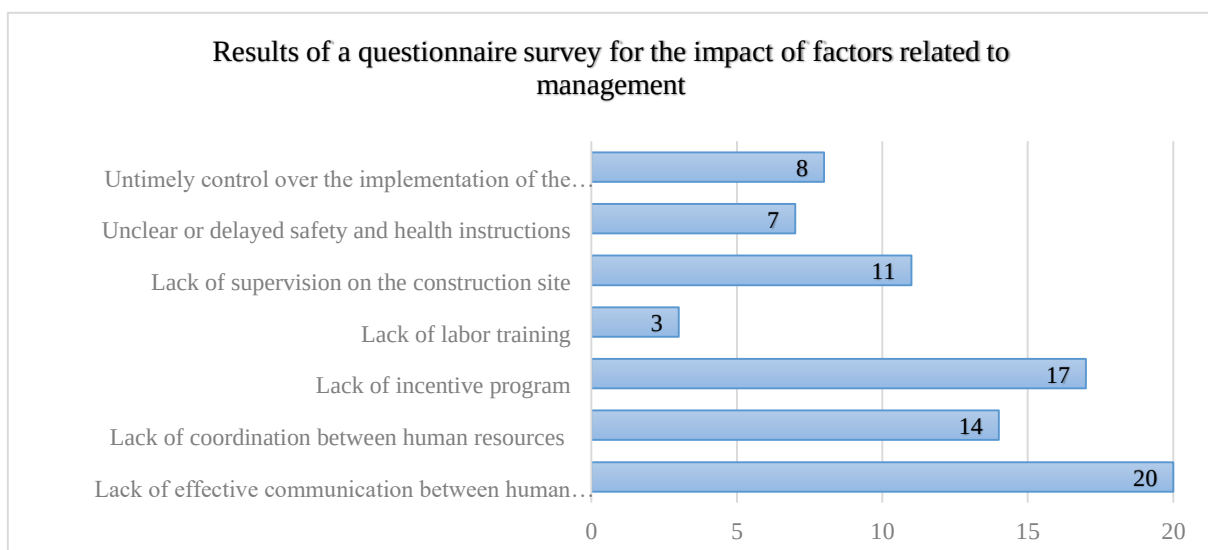


Fig. 1. Results of a questionnaire survey for the impact of factors related to management of construction organization on labor productivity and loss of working time

The factor related to the lack of training for qualification and improving skills is placed in the first place only by 3 construction workers.

Table 2 presents the seven main factors that disrupt the work process and which are assigned to the group of technical resource related factors (construction materials, construction machinery and equipment).

Group of technical resources related factors		
Factors	Factors	Factors
1	Inefficient, old equipment	Poor productivity, insufficient or missing motivation etc.
2	Construction tool, mechanization and equipment shortage	Interruption of the construction process, lag in the term for execution of construction works, revision of the construction program, need for subsequent increase of the productivity of the human resources
3	Untimely deliveries of construction materials and equipment	Interruption of the construction process, delay in the execution of construction works, revision of the schedule for delivery of materials, the need for subsequent increase in human productivity, as well as the need to increase the resources for the construction site within the agreed period, search for alternatives providers
4	Lack of construction materials	Search for alternative suppliers, interruption of the construction process, delay the deadline for implementation of works, breach of contract
5	Damage and accidents of tools and equipment	Interruption of the construction process, danger of accidents and occupational accidents, etc.
6	Unavailability of material on the construction site	Danger of accidents at work, the presence of unnecessary work, loss of effective working time
7	Unsuitability of storage areas	Search for an alternative for storing materials; problems with the availability of stocks of materials; revision of the schedule for delivery of materials, etc.

Table 2. Group of resource related factors. Manifestation and consequences that arise from them.

Among the opinions of the interviewed workers clear stand two main reasons, that are typical to the construction sites in our country, that directly affect labor productivity and efficiency in the labor process, namely: lack of modern equipment (referred first 25 workers) and shortage of tools, equipment and construction machinery (ranked first by 20 workers). (Fig. 2).

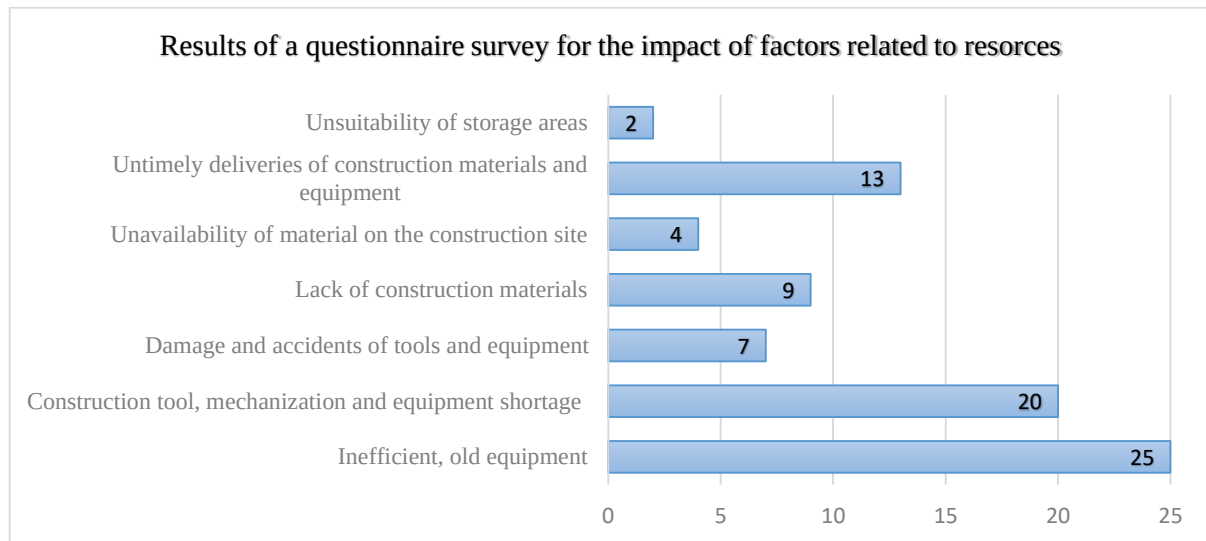


Fig. 2. Results of a questionnaire survey for the impact of c of construction organization on labor productivity and loss of working time

Table 3 gives the reasons that cause losses of working hours related to human labor.

Group of human/labor related factors		
Factors	Factors	Factors
1	Lack of manpower	Interruption of the construction process, delay the deadline for implementation of works, breach of contract
2	Shortage of experience	Low quality of execution, risk of unnecessary work, risk of accidents and others.
3	Untimely payments	Insufficient or missing motivation, Labor discipline violation etc.,
4	Unregulated breaks during working hours	Poor productivity, Labor discipline violation etc.,
5	Working overtime	Lowering the motivation to work and reducing labor productivity
6	Physical fatigue	Poor productivity, danger of accidents and occupational accidents, lowering the motivation of workers
7	Accidents as a result of non-compliance with safety rules	Incidents and work accidents, suspension of the construction of the site, sanctions, damage to the prestige of the construction company, etc.
8	Labor dissatisfaction	Poor productivity, Labor discipline violation etc.,

Table 3. Group of human/labor related factors. Manifestation and consequences that arise from them.

Among the factors related to human resources, the lack of manpower and in particular skilled labor clearly stands out (This factor is mentioned in the first place by 25 workers.) Nineteen people, out of a

total of 80 respondents, put in the first place for reduction of productivity and loss of working hours from shortage of experience. According to sixteen of them, untimely payment is a demotivating factor that has the strongest impact on the productivity of construction workers. (Fig. 3)

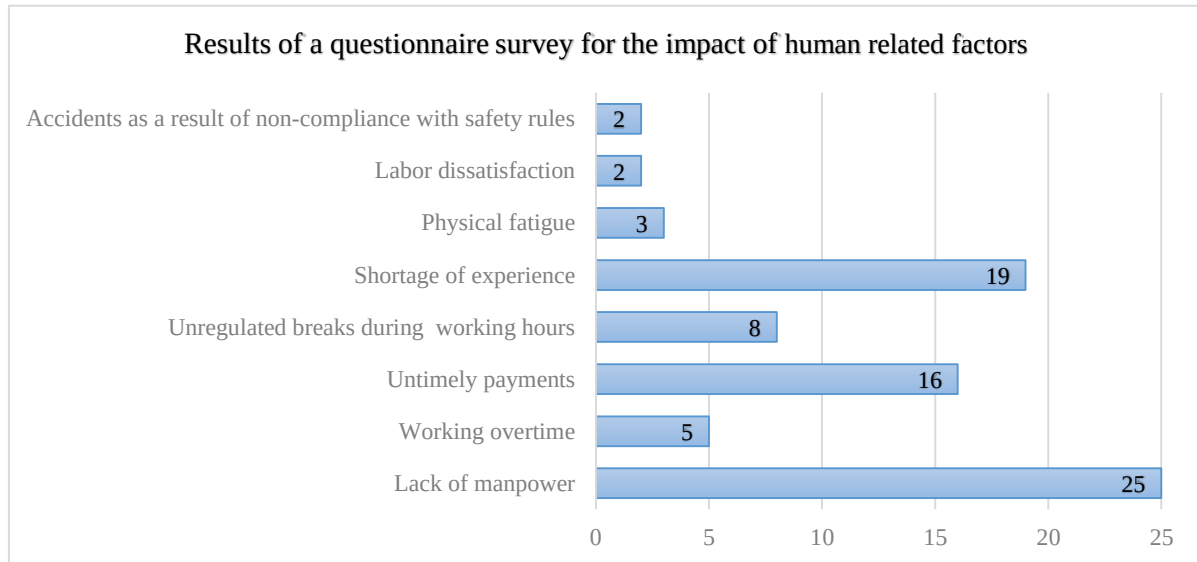


Fig. 3. Results of a questionnaire survey for the impact of human/labor related factors of construction organization on labor productivity and loss of working time

Table 4 presents the group of technical factors that cause loss of working time.

Group of technical related factors		
Factors	Factors	Factors
1	Complexity projects	Decreased motivation, inability to find a sufficiently qualified workforce
2	Poor organization and management	Low labor productivity, delay in the planned timeframe, increasing the value of the project, violating the agreed deadlines, risk of accidents
3	Rework	Increasing the value of a construction project, extending the construction period
4	Poor site layout planning	Increasing the value of a construction project, lowering labor productivity, poor working environment
5	Incomplete and unclear drawings and specifications	Need for reworking or new drawings, loss of effective time
6	Bad weather conditions	Need further increase the productivity of human resources, risk of delay in the deadline for construction of the facility, the risk of poor quality of the construction works
7	Poor site condition	Dissatisfaction, low motivation of the workforce, danger of accidents or occupational accidents, decreased labor productivity

8	Changes during construction or accidental factors affecting labor productivity	Revision of the construction program, the need to increase the productivity of human resources, as well as the need to increase the resources for the implementation of the construction project according to the agreed deadline, search for alternative solutions, suspension of construction
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Table 4. Group of technical related factors. Manifestation and consequences that arise from them.

These factors depend on the characteristics of the surrounding area and the size of the construction site, which is why they are rated fairly equivalent of respondents workers, taking into account the conditions under which they work. Eighteen people, out of a total of 80 respondents, believe that the strongest impact on the loss of working time during the day is the complexity of the project and the lack of sufficient detail about the applied implementation technology. According to 15 of them, this is the poor organization and management during the execution, and according to 13 workers, this is the rework (Fig. 4).

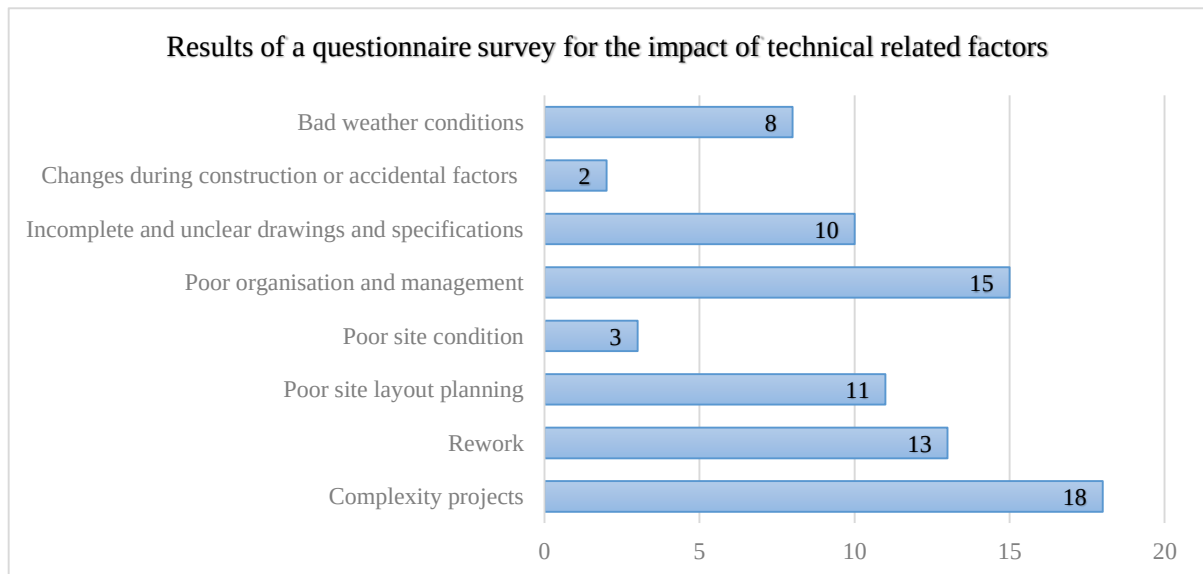


Fig. 4. Results of a questionnaire survey for the impact technical related factors of construction organization on labor productivity and loss of working time

Fig. 5 presents the share of each group of factors influencing the working hours, based on the analyzed results of the survey. The graph shows that the effective working time represents 35% of the total working time. The share of working time losses related to management factors amounts to 24%, and that related to human factors - 21%. The lowest share within the working hours has the losses related to the factors of technical resources (7%), which shows that construction companies have modern tools, construction machinery and equipment; serious suppliers of construction materials; well-organized storage areas on construction sites, etc.

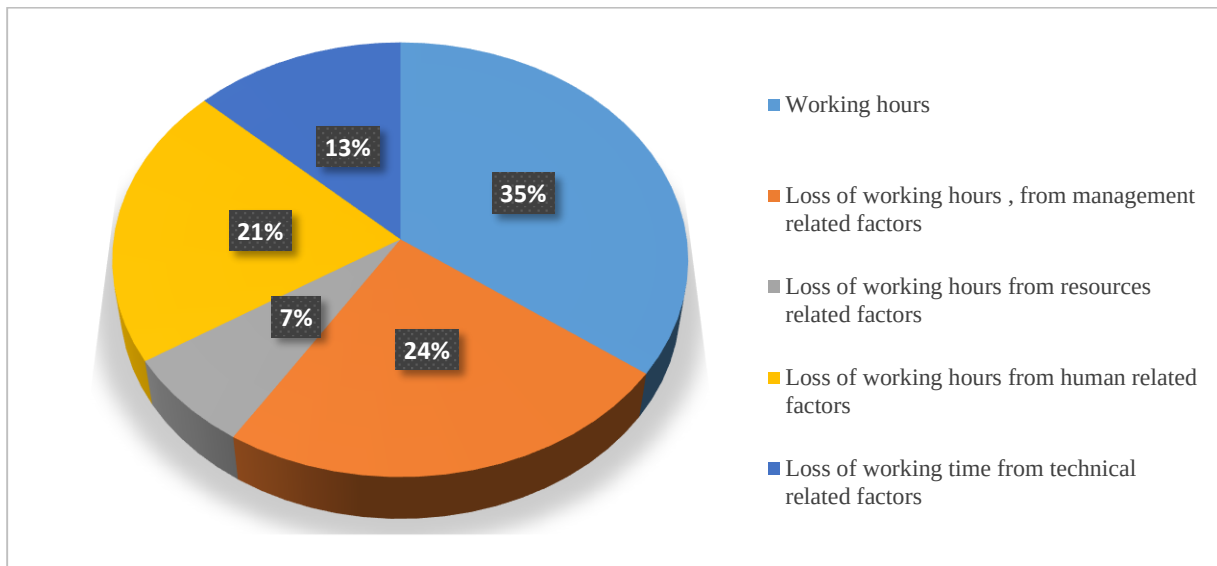


Fig. 5. Share of each group of factors influencing the working hours

4. CONCLUSIONS

The study shows the formation of four main groups of factors influencing the productivity of construction workers in working conditions in our country, namely: factors related to the management of the construction organization; factors related to technical resources; human /labor factors and technological factors.

The highest share of lost working time is related to the factors of management of the construction organization, which include: lack of effective communication at different levels of management, lack of a program to stimulate human resources, lack of coordination between construction workers site, untimely control of the performed construction and installation works, etc.

The lowest share of working time have losses related to the factors of technical resources, including obsolete equipment, lack of tools and construction machinery, untimely delivery of construction materials, unsuitability of storage areas, etc.

One of the necessary steps for construction companies in our country is the introduction of a comprehensive approach to human resource management on the construction site, which will reduce the loss of working hours through: adequate training of workers, introduction of motivational policy of the organization and a program for stimulating, building clear channels for the exchange of information and coordination between the different working groups and the different hierarchical levels, timely control and supervision of the work process and maintenance of serious rules regarding labor discipline.

Increasing the productivity of construction workers through the implementation of a good and site-specific management policy will significantly increase the satisfaction and commitment of construction workers and will contribute to the sustainable development and competitiveness of the construction organization.

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