Comparative assessment of the state of industrial injuries in the Rostov region and in other territorial subjects of the Federation of the Southern Federal District

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Abstract. The aim of the study is to analyze the state of industrial injuries and working conditions in the Rostov region and compare the data obtained with similar indicators for other territorial subjects of the Southern Federal District and the Russian Federation as a whole. The results obtained indicate the effectiveness of measures taken in the region to improve working conditions and reduce the level of injuries.

1. Introduction

Human potential is the main asset of any region, its state largely depends on working conditions, indicators of industrial injuries and occupational morbidity (OM). According to the data of the Rostov regional branch of the FSS of the Russian Federation, more than 1 million 200 thousand people work in the economy sphere of the Rostov region (RR).

The organization of workers’ labor depends on such indicators as the level of injury and mortality of workers, the quantity and quality of products created, and finally, the culture of production safety, therefore the creation of safe and harmless working conditions in the workplace, the reduction of the level of injury and morbidity is a very important direction in the implementation of state policy in the field of labor protection in any region.

When studying the level of industrial injuries in RR and other subjects of the Federation, the relevant materials of a number of Ministries, FSS, GIT, official bodies of statistical reporting [1, 2, 3, 4] and earlier works of the author on the problem are under consideration [5, 6, 7, 8, 9], as well as works by other authors [10, 11,12,13,14,15,16].

2. Data on the level of industrial injuries in the Southern Federal District

Rostov region (RR) is one of the territorial subjects of the Russian Federation, which is the part of the Southern Federal District (SFD). In addition to RR, the SFD includes 5 constituent entities of the Federation. Since 2016, by the Decree of the President of Russia, the Republic of Crimea and the federal city of Sevastopol have also been included in the Southern Federal District, however, data on these territorial subjects of the Russian Federation are not included in the proposed study.

Analyzing the average number of employees in the Southern Federal District for an 8-year period (Table 1), we can conclude that the highest number of employed population is in Krasnodar region (38 %), in RR (32 %), Volgograd Region (19 %).

The highest number of employees in the Southern Federal District was recorded in 2016 - 1887.1 thousand people, in RR – in 2014 (590.9 thousand people).
It should be noted that the general decrease in the average number of employees in the Russian Federation over the past decade, especially since 2016, is a generally recognized fact associated with many reasons: the specifics of the demographic situation, rather low involvement of older people in the economy, and others.

**Table 1.** Average number of employees in the Russian Federation and the constituent entities of the Russian Federation in the Southern Federal District in 2011-2018 (according to Rosstat).

| Subjects of the Russian Federation | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------------------------------|------|------|------|------|------|------|------|------|
| the Russian Federation            | 21143| 21687| 21292| 21664| 20924| 20807| 20168| 19897|
| SFD                              | 1784 | 1817 | 1696.4| 1785.7| 1726.9| 1887.1| 1856.6| 1828.5|
| Adygea                           | 37.4 | 37.6 | 38.5 | 38.2 | 37.5 | 39.1 | 37.6 | 39.2 |
| Astrakhan region                 | 132.6| 140.8| 136.3| 133.6| 127.23| 111.9 | 108.0 | 101.0 |
| Volgograd region                 | 357.1| 354.2| 345.8| 339.7| 326.2| 319.1 | 300.7 | 295.0 |
| Kalmykia                         | 27.1 | 25.0 | 25.8 | 24.5 | 23.5 | 22.3 | 20.8 | 20.5 |
| Krasnodar region                 | 687.8| 690.9| 683.3| 658.7| 636.8| 617.1 | 628.6 | 619.8 |
| Rostov region                    | 542.0| 568.4| 559.0| 590.9| 575.7| 555.1 | 536.5 | 527.0 |

The analysis of the number of victims of emergency situations at work around the constituent entities of the Southern Federal District for an 8-year period (Table 2) showed that the majority of victims are in the Rostov region, Krasnodar region and Volgograd region. It would be logical to assume that the number of emergency situations occurring is directly proportional to the population of the regions, however, in the RR with the number of employees less than in the Krasnodar region in 2011-2016 there were more accidents, which is probably due to the structure of industrial and the economic activity of these regions - it is known that an important source of income for the Krasnodar region is the tourism industry, while the share of industry in comparison with the average Russian indicators and indicators of the Southern Federal District is almost 2 times lower.

It should also be noted that, according to Rosstat data [1, 2], over the 8 years under study in the constituent entities of the Southern Federal District, the total number of injured in accidents has been steadily decreasing (Table 2).

An analysis of the number of fatalities in the same period showed that the main number of deaths also happens in the Krasnodar region, Rostov and Volgograd regions [1, 2]. However, in contrast to the previous indicator, there is no noticeable, significantly traceable trend towards a decrease in the number of fatalities during the last 8 years (Table 3).
Table 2. The number of victims of emergency situations at work in the Russian Federation and constituent entities of the Russian Federation in the Southern Federal District in 2011-2018 (absolute indicators).

| Subjects of the Russian Federation | The number of people injured at the workplace with disability for one working day or more and with a fatal outcome |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------|
|                                   | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| the Russian Federation            | 4359 | 4037 | 3558 | 3133 | 2824 | 2674 | 2544 | 2359 |
| SFD                               | 2964 | 2777 | 2272 | 2052 | 1732 | 1922 | 1751 | 1669 |
| Adygea                            | 69   | 68   | 51   | 34   | 36   | 57   | 45   | 55   |
| Astrakhan region                  | 208  | 163  | 140  | 128  | 93   | 94   | 80   | 76   |
| Volgograd region                  | 822  | 747  | 672  | 520  | 500  | 460  | 396  | 363  |
| Kalmykia                          | 28   | 48   | 35   | 26   | 40   | 36   | 20   | 22   |
| Krasnodar region                  | 834  | 821  | 637  | 666  | 487  | 543  | 585  | 536  |
| Rostov region                     | 1430 | 930  | 737  | 678  | 576  | 561  | 459  | 486  |

Table 3. The number of victims of accident at work with a fatal outcome in the Russian Federation and the constituent entities of the Russian Federation in the Southern Federal District in 2011-2018 (absolute indicators).

| Subjects of the Russian Federation | The number of fatalities in occupational health injuries |
|-----------------------------------|--------------------------------------------------------|
|                                   | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| the Russian Federation            | 1824 | 1820 | 1699 | 1456 | 1288 | 1290 | 1138 | 698  |
| SFD                               | 135  | 119  | 131  | 114  | 93   | 96   | 100  | 105  |
| Adygea                            | 1    | 1    | 2    | 2    | 1    | 1    | 1    | 4    |
| Astrakhan region                  | 11   | 10   | 11   | 11   | 6    | 10   | 7    | 1    |
| Volgograd region                  | 29   | 28   | 26   | 15   | 16   | 13   | 17   | 14   |
| Kalmykia                          | 2    | 1    | 3    | 1    | 3    | 5    | 3    | 1    |
| Krasnodar region                  | 40   | 35   | 47   | 49   | 48   | 19   | 41   | 39   |
| Rostov region                     | 52   | 44   | 42   | 36   | 19   | 34   | 24   | 34   |
The most informative indicators in research in the field of industrial injuries are relative indicators – the coefficients of frequency, severity and mortality. Their dynamics during the study period changed, as shown in Table 4 [1, 2].

**Table 4. Dynamics of the frequency coefficient of industrial injuries in the Russian Federation and in the Southern Federal District for the period from 2011 to 2018.**

| Subjects of the Russian Federation | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----------------------------------|------|------|------|------|------|------|------|------|
| the Russian Federation           | 2.1  | 1.9  | 1.7  | 1.4  | 1.3  | 1.3  | 1.3  | 1.2  |
| SFD                             | 1.7  | 1.5  | 1.3  | 1.1  | 1    | 1    | 0.9  | 0.9  |
| Adygea                          | 1.8  | 1.8  | 1.3  | 0.9  | 1    | 1.5  | 1.2  | 1.4  |
| Astrakhan region                 | 1.6  | 1.2  | 1.0  | 1.0  | 0.7  | 0.8  | 0.7  | 0.8  |
| Volgograd region                 | 2.3  | 2.1  | 1.9  | 1.5  | 1.5  | 1.4  | 1.3  | 1.2  |
| Kalmykia                         | 1.0  | 1.9  | 1.4  | 1.1  | 1.1  | 1.6  | 1    | 1    |
| Krasnodar region                 | 1.2  | 1.2  | 0.9  | 1.0  | 0.8  | 0.9  | 0.9  | 0.9  |
| Rostov region                    | 1.9  | 1.6  | 1.3  | 1.1  | 1    | 1    | 0.9  | 0.9  |

**Table 5. Dynamics of the mortality rate of industrial injuries in the Russian Federation and in the Southern Federal District for the period from 2011 to 2018 (according to Rosstat).**

| Subjects of the Russian Federation | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----------------------------------|------|------|------|------|------|------|------|------|
| the Russian Federation           | 0.086| 0.084| 0.080| 0.067| 0.062| 0.062| 0.056| 0.054|
| SFD                             | 0.076| 0.065| 0.073| 0.064| 0.054| 0.051| 0.054| 0.057|
| Adygea                          | 0.027| 0.027| 0.052| 0.052| 0.027| 0.027| 0.027| 0.102|
| Astrakhan region                 | 0.083| 0.071| 0.081| 0.082| 0.047| 0.089| 0.065| 0.01 |
| Volgograd region                 | 0.081| 0.079| 0.075| 0.044| 0.049| 0.041| 0.057| 0.047|
| Kalmykia                         | 0.074| 0.040| 0.116| 0.041| 0.128| 0.223| 0.144| 0.049|
| Krasnodar region                 | 0.058| 0.051| 0.069| 0.074| 0.075| 0.031| 0.065| 0.063|
| Rostov region                    | 0.096| 0.077| 0.075| 0.061| 0.033| 0.061| 0.045| 0.065|
In the Russian Federation and in the Southern Federal District as a whole, the frequency of industrial injuries during this period was steadily decreasing, especially at the beginning of the studied decade (by 10-20% per year in the Russian Federation, by 13-18% per year in the Southern Federal District). At the same time, it is possible to distinguish territories where there are bursts of industrial injuries and the tendency to decrease is not so clearly traced (Adygea and Kalmykia), in the rest of the subjects of the Federation the rate of decrease in injuries has slowed down.

The mortality rate also tends to decrease, for example, its indicators for 2017-2018 were everywhere lower than in 2010, while in general for the Russian Federation in 2015 and 2016 its value has not changed, in the territory of the Southern Federal District this indicator has decreased by 5.8%, and in some constituent entities of the Southern Federal District this indicator increased in 2016 (Astrakhan and Rostov region).

3. The state of the industrial injuries and working conditions in the RR

The RR economy is represented by various industries, including coal mining, metallurgy, chemical, construction, agricultural, which are traditionally considered traumatic. For the period from 2011 to 2018, according to the data of the Inspectorate-General for Labour (IGL) in RR, the number of incidents in production exceeded 1600 cases, the total number of deaths was 549 people (Table 6) [4].

Table 6. Analysis of the production incidents at enterprises and organizations of RR from 2011 to 2018.

| Industrial accidents | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----------------------|------|------|------|------|------|------|------|------|
| Total including:     |      |      |      |      |      |      |      |      |
| - group              | 38   | 33   | 30   | 25   | 28   | 25   | 15   | 14   |
| - severe             | 232  | 154  | 116  | 99   | 103  | 105  | 94   | 82   |
| - fatal              | 90   | 59   | 57   | 38   | 41   | 45   | 46   | 43   |
| - total death toll   | 110  | 88   | 77   | 52   | 56   | 51   | 62   | 53   |

A study carried out according to the data of the State Inspectorate for Civil Engineering in the RR shows that the highest level of industrial injuries for the period from 2011 to 2018 is observed in manufacturing (on average 21%), during construction work (15%), in transport and in communication organizations (12%), as well as in trade (about 9%) and during agricultural work (over 8%). In some years, the indicators for some types of economic activity differ significantly from the average values, for example, by the end of 2015, 43% of accidents occurred in manufacturing, 37% in construction, and 20% in agriculture.

More often than others, the reasons for incidents are: unsatisfactory organization of work (more than 35% of cases), violation of traffic rules (from 22 to 34% of cases), violation of the technological process (from 8 to 13% of cases). At the same time, it is known that, in addition to the listed reasons, the main reasons for accidental damage at enterprises with a small number of employees (up to 100 people) are the lack of provision of workers with protective equipment, violation of safety measures when working in sewer wells and collectors and at height.

According to the presented statistics for 2018 for RR, the number of workers involved in work with harmful and (or) hazardous working conditions amounted to 18.6% of the total number of workers.

Among the main unfavorable factors are noise (22.7%), illumination (18.1%), vibration (15.2%) and microclimate (8%).

4. Conclusion

Thus, the analysis of the dynamics of industrial injuries leads to the following conclusions. During the study period, the industrial injuries indicators both in the country as a whole and in the Southern
Federal District and in its individual constituent entities, in particular in the RR, have been decreasing in recent years (the frequency coefficient in the Southern Federal District and RR has decreased by 2.1 times; fatality rate - in the Southern Federal District has decreased by 1.3 times, in RR – by 1.48). It can be assumed that such an improvement is due to close attention to the problems and the effectiveness of the preventive measures used in this area.

In the region, a database on the National Assembly has been formed on the platform of the Ministry of Labor, which makes it possible to obtain an objective picture of what is happening in order to develop the most effective preventive measures.

Since 2016, the provisions of the Zero Injury program have been dynamically implemented.

It makes sense to pay attention to the fact that the industrial injuries indicators are traditionally high in manufacturing, in construction organizations, transport companies and in housing and communal services organizations. In this regard, the Ministry of Labor and Social Development in the RR in 2017 developed a project “State patronage in the field of labor protection - the development of small and medium-sized businesses of the Don”, which was included in the Plan of Additional Measures of the Government of the Rostov Region to ensure economic growth rates exceeding the national average level, for 2017 - 2020. During the implementation of the Project, it is planned to select organizations in which the most severe or fatal emergency situations take place, conduct an occupational safety audit there, and develop a plan of preventive measures.

At the end of 2018, the total number of evaluated jobs as part of the special assessment of working conditions procedure is more than 85%. In the same year alone, 11 state examinations were carried out to assess the quality of working conditions with identified violations.

The work on training of managers and specialists of organizations on labor protection issues and conducting information, explanatory and advocacy work in this area continues.

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