

**INDEX NUMBERS OF THOSE KILLED
IN FIRES IN RURAL AREAS OF THE RUSSIAN FEDERATION
IN THE 2006 - 2010 PERIOD**

UDC 311.3:614.84:631.1 "2006/2010" (470)

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Abstract. *One of the problems of safety in terms of vital activity is an absence index, showing the situation regarding harm done to the people in rural areas from fire on the territory of the Russian Federation. In the economy and on the stock market, for the estimation of the condition the index Dow Jones is actively used. The calculation of the index of the amount of ruin as a result of fire in rural terrains was in progress on the territory of the Russian Federation in the period from 2006 to 2010 based on the approach of the Dow Jones. The regions requiring the most urgent solutions and regions with crisis situations were chosen. The index of the amount of ruin as a result of fire in rural terrains can be used when making management and trained decisions, like the Dow Jones index is used in finance and economy.*

Key words: *destruction as a result of fire in rural terrains, the Dow Jones Average*

1. INTRODUCTION

The most important task of life safety is ensuring the safety of people. In rural areas, we are often faced with the loss of life in fires. The most important factor is the number of deaths in the region of the Russian Federation [1]. The usefulness and necessity of this indicator is not questionable. However, to date, what hindered the selection of the most dangerous regions was the lack of any clear criteria for their definition. The problem of identifying the most problematic regions can be solved by using the Dow Jones [2, 3], which has wide application in the economy and on the financial market.

THE METHOD

The ability to use fire danger indexes, calculated by the method of the Dow Jones was shown in [4 - 8]. In the first stage subjects of the Russian Federation were ranked by the number of deaths in descending order. Next, we select 30 subjects of the Russian Federation with the maximum value of the number of deaths. The index number killed in fires is calculated by averaging the data for 30 regions.

RESULTS AND DISCUSSION

In the listings can be identified for the critical group for which the number of deaths exceeds the value of the index. In 2006, a group of critical hit regions was identified (Table 1): Moscow, Nizhny Novgorod regions; Krasnodar, Krasnoyarsk territory; Leningrad region; Bashkotarstan; Altai, Perm territory; Voronezh region, Tatarstan.

Table 1. The index listing the number of fatalities in rural areas for 2006

| Site | Region | Death | Site | Region | Death |
|------------------------------|------------------------|-------|------|---------------------|-------|
| 1 | Moscow region | 405 | 16 | Kirov region | 136 |
| 2 | Nizhny Novgorod region | 279 | 17 | Saratov region | 135 |
| 3 | Krasnodar territory | 235 | 18 | Volgograd region | 130 |
| 4 | Krasnoyarsk territory | 226 | 19 | Arkhangelsk region | 129 |
| 5 | Leningrad region | 216 | 20 | Novosibirsk region | 128 |
| 6 | Republic Bashkotarstan | 213 | 21 | Irkutsk region | 125 |
| 7 | Altai territory | 210 | 22 | Kaluga region | 124 |
| 8 | Perm territory | 192 | 23 | Yaroslavl region | 121 |
| 9 | Voronezh region | 185 | 24 | Penza region | 120 |
| 10 | Republic of Tatarstan | 164 | 25 | Samara region | 119 |
| 11 | Rostov region | 161 | 26 | Ryazan region | 115 |
| 12 | Pskov region | 147 | 27 | Chelyabinsk region | 113 |
| 13 | Primorye territory | 143 | 28 | Stavropol territory | 111 |
| 14 | Sverdlovsk region | 142 | 29 | Kurgan region | 110 |
| 15 | Tver region | 139 | 30 | Smolensk region | 110 |
| The index number of the dead | | | | | 163 |

In 2007, the list of critical regions is as follows (Table 2): the Moscow region; Krasnodar territory; Nizhny Novgorod, Leningrad region; Bashkotarstan; Altai territory; Rostov region; Perm, Krasnoyarsk territory; Voronezh region.

The composition of the critical group in 2008 (Table 3): the Moscow region; Krasnodar territory; Nizhny Novgorod region; Bashkotarstan; Altai, Krasnoyarsk territory; Leningrad, Rostov, Voronezh regions, Perm territory.

Table 2. The index listing the number of fatalities in rural areas for 2007

| Site | Region | Death | Site | Region | Death |
|------------------------------|------------------------|-------|------|---------------------|-------|
| 1 | Moscow region | 423 | 16 | Primorye territory | 144 |
| 2 | Krasnodar territory | 287 | 17 | Pskov region | 144 |
| 3 | Nizhny Novgorod region | 253 | 18 | Tver region | 139 |
| 4 | Leningrad region | 227 | 19 | Vologda region | 129 |
| 5 | Republic Bashkotarstan | 207 | 20 | Yaroslavl region | 125 |
| 6 | Altay territory | 207 | 21 | Saratov region | 124 |
| 7 | Rostov region | 195 | 22 | Novosibirsk region | 122 |
| 8 | Perm territory | 189 | 23 | Belgorod region | 110 |
| 9 | Krasnoyarsk territory | 182 | 24 | Bryansk region | 110 |
| 10 | Voronezh region | 177 | 25 | Omsk region | 110 |
| 11 | Kirov region | 157 | 26 | Penza region | 110 |
| 12 | Republic of Tatarstan | 152 | 27 | Tula region | 109 |
| 13 | Sverdlovsk region | 150 | 28 | Stavropol territory | 106 |
| 14 | Volgograd region | 149 | 29 | Ryazan region | 106 |
| 15 | Samara region | 146 | 30 | Kaluga region | 105 |
| The index number of the dead | | | | | 163 |

Table 3. The index listing the number of fatalities in rural areas for 2008

| Site | Region | Death | Site | Region | Death |
|------------------------------|---------------------------|-------|------|---------------------|-------|
| 1 | Moscow Region | 363 | 16 | Saratov region | 133 |
| 2 | Krasnodar territory | 260 | 17 | Sverdlovsk region | 131 |
| 3 | Nizhny Novgorod region | 228 | 18 | Samara region | 123 |
| 4 | Republic Bashkotarstan | 227 | 19 | Primorye territory | 121 |
| 5 | Altay territory | 193 | 20 | Chelyabinsk region | 115 |
| 6 | Krasnoyarsk territory | 191 | 21 | Belgorod region | 113 |
| 7 | Leningrad region | 188 | 22 | Bryansk region | 113 |
| 8 | Rostov region | 182 | 23 | Kaluga region | 111 |
| 9 | Voronezh region | 160 | 24 | Penza region | 110 |
| 10 | Perm territory | 152 | 25 | Orenburg region | 109 |
| 11 | The Republic of Tatarstan | 149 | 26 | Stavropol territory | 108 |
| 12 | Volgograd region | 143 | 27 | Irkutsk region | 108 |
| 13 | Novosibirsk region | 141 | 28 | Omsk region | 108 |
| 14 | Pskov region | 137 | 29 | Vologda region | 107 |
| 15 | Kirov region | 136 | 30 | Tver region | 104 |
| The index number of the dead | | | | | 152 |

In 2009 the group of critical hit regions (Table 4) included: the Moscow region; Bashkotarstan; Krasnodar territory; Nizhny Novgorod, Rostov regions; Perm, Krasnoyarsk territory; Sverdlovsk, Leningrad, Voronezh regions, Altai territory.

In 2010, the critical situation was determined in the following regions (Table 5): the Moscow region; Krasnodar territory; Bashkotarstan; Nizhny Novgorod region; Krasnoyarsk territory; Leningrad, Rostov, Sverdlovsk regions; Altai, Perm territory, Voronezh region.

Table 4 The index listing the number of fatalities in rural areas for 2009

| Site | Region | Death | Site | Region | Death |
|------------------------------|---------------------------|-------|------|---------------------|-------|
| 1 | Moscow Region | 387 | 16 | Tver region | 125 |
| 2 | Republic Bashkotarstan | 228 | 17 | Bryansk region | 123 |
| 3 | Krasnodar territory | 219 | 18 | Kirov region | 120 |
| 4 | Nizhny Novgorod region | 211 | 19 | Novosibirsk region | 119 |
| 5 | Rostov region | 190 | 20 | Primorye territory | 116 |
| 6 | Perm territory | 178 | 21 | Irkutsk region | 114 |
| 7 | Krasnoyarsk territory | 174 | 22 | Penza region | 110 |
| 8 | Sverdlovsk region | 171 | 23 | Orenburg region | 109 |
| 9 | Leningrad region | 168 | 24 | Stavropol territory | 102 |
| 10 | Voronezh region | 166 | 25 | Arkhangelsk region | 100 |
| 11 | Altay territory | 156 | 26 | Saratov region | 100 |
| 12 | The Republic of Tatarstan | 138 | 27 | Novgorod region | 99 |
| 13 | Pskov region | 135 | 28 | Smolensk region | 97 |
| 14 | Samara region | 133 | 29 | Tyumen region | 93 |
| 15 | Volgograd region | 131 | 30 | Udmurtia | 93 |
| The index number of the dead | | | | | 147 |

Table 5 The index listing the number of fatalities in rural areas for 2010

| Site | Region | Death | Site | Region | Death |
|------------------------------|---------------------------|-------|------|---------------------|-------|
| 1 | Moscow Region | 326 | 16 | Saratov region | 112 |
| 2 | Krasnodar territory | 219 | 17 | Tver region | 112 |
| 3 | Republic Bashkotarstan | 215 | 18 | Orenburg region | 111 |
| 4 | Nizhny Novgorod region | 215 | 19 | Samara region | 109 |
| 5 | Krasnoyarsk territory | 182 | 20 | Novosibirsk region | 107 |
| 6 | Leningrad region | 180 | 21 | Bryansk region | 106 |
| 7 | Rostov region | 168 | 22 | Penza region | 104 |
| 8 | Sverdlovsk region | 152 | 23 | Volgograd region | 100 |
| 9 | Altay territory | 149 | 24 | Tyumen region | 99 |
| 10 | Perm territory | 149 | 25 | Chelyabinsk region | 99 |
| 11 | Voronezh region | 141 | 26 | Kurgan region | 98 |
| 12 | Pskov region | 133 | 27 | Udmurtia | 95 |
| 13 | The Republic of Tatarstan | 128 | 28 | Lipetsk region | 95 |
| 14 | Irkutsk region | 125 | 29 | Stavropol territory | 93 |
| 15 | Kirov region | 124 | 30 | Vladimir Region | 91 |
| The index number of the dead | | | | | 138 |

The analysis of the locations of regions in the listings calculating the index number of deaths shows the presence of 6 groups of regions that play a different role (Table 6).

The first group contains regions that for the 2006 - 2010 period were not included in the listing once. The second group consists of regions that were included once only. The third group comprises the subjects of the Russian Federation that were included in the Listing 2 times. The fourth - 3 times. The fifth - 4 times. The sixth - 5 times (i.e., regions of the group present in the listing for 5 years).

Table 6 The frequency of occurrence of regions of the Russian Federation in the calculation of an index listing the number of fatalities as a result of fire in rural areas for the period 2006 - 2010

| Group | Regions | Rate |
|-------|---|-------|
| 6 | Voronezh region, Moscow region, Tver region ; Leningrad, Pskov region; Krasnodar territory, Volgograd and Rostov region; Stavropol territory; Republic of Bashkortostan, Tatarstan, Perm territory, Kirov region, Nizhny Novgorod region, Penza region, Samara region, Saratov region; Sverdlovsk region; Altai territory, Krasnoyarsk, Novosibirsk region; Primorsky territory | 0,033 |
| 5 | Bryansk region; Irkutsk region | 0,027 |
| 4 | Kaluga region; Orenburg region; Chelyabinsk region | 0,02 |
| 3 | Belgorod, Ryazan region, Smolensk region, Yaroslavl region; Arkhangelsk, Vologda region; Udmurtia; Kurgan region, Tyumen region; Omsk region | 0,013 |
| 2 | Vladimir region, Lipetsk region, Tula region; Novgorod region | 0,007 |
| 1 | Another regions | 0 |

In addition, it is possible to determine the frequency of occurrence of the regions in crisis group (Table 7). It also included region 6 groups (Table 7).

Table 7 The frequency of regions in crisis group the 2006 - 2010 period

| Group | Regions | Rate |
|-------|--|-------|
| 6 | Voronezh region, Moscow region; Leningrad region; Krasnodar territory; Republic of Bashkortostan, Perm territory, Nizhny Novgorod region; Altai territory, Krasnoyarsk territory | 0,096 |
| 5 | Rostov region | 0,077 |
| 4 | No | 0 |
| 3 | Sverdlovsk region | 0,038 |
| 2 | Republic of Tatarstan | 0,038 |
| 1 | Another regions | 0 |

The first group of regions never got into the Crisis Group, the second were the subjects of the Russian Federation who were mentioned once. The third regions were included twice. The fourth were included 3 times, the fifth 4 times, the sixth 5 times. The systematic presence of a number of regions within the crisis team for the 2006 - 2010 period shows the need to find new management solutions.

CONCLUSIONS

As a result, the index calculated the number of deaths as a result of fire in the rural areas in the Russian Federation for the 2006-2010 period. For each year, 30 regions were identified with a dangerous situation with loss of life, and were included in the calculation of the index listing.

Also, for each year we determined the composition of a crisis group that requires immediate action. We calculated the frequency of contact regions in the listing and in the Crisis Group. As a result, groups of regions were identified by systematically entering the calculation of the index and the listing of the Crisis Group.

The index number of deaths from fires in rural areas can be used to inform management and personnel decisions, and could have wide use, like the Dow Jones in economics and finance.

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INDEKS BROJA POGINULIH U POŽARIMA U RURALNIM OBLASTIMA RUSKE FEDERACIJE U PERIODU 2006 - 2010

Jedan od problema prilikom određivanja ključnih aktivnosti sprovođenja bezbedonosnih mera je nedostatak indeksa koji bi prikazao podatke o osobama poginulim u požarima u ruralnim oblastima Ruske Federacije. U ekonomiji i na berzama za procenu uslovu aktivno se koriste indeksi kao što je Dow Jones. Izračunavanje indeksa o broju poginulih u požarima u ruralnim oblastima Ruske Federacije u periodu 2006-2010 može se sprovesti na primeru Dow Jones. Oblasti kojima je potrebna najveća pomoć i oblasti sa velikim brojem kriznih situacija se biraju. Sam indeks može se koristiti kada se donose odluke o upravljanju slično kao što se Dow Jones koristi u oblastima finansija i ekonomije.

Ključne reči: broj poginulih u požarima u ruralnim oblastima, Dow Jones indeks