## RESEARCH IN DUST AIR POLLUTION LEVEL IN THE INDUSTRIAL AREAS OF TOMSK

**N.P. Samokhina**
Scientific advisors associate professor A.V. Talovskaya, associate professor I.A. Matveenko
***National Research Tomsk Polytechnic University, Tomsk, Russia***

The enterprises of thermal power generation, building and petrochemical industries are considered to be the typical sources of environmental contamination for the many regions of the world.

During the period from 2009 to 2013 sampling was conducted using a vector network in the northeastern direction (mainly southern and south-western winds) for the assessment of dust level in air in industrial areas of Tomsk (reinforced concrete plants, brick plants, thermal power plant, petrochemical plant).

Collection, preparation and analysis of samples were performed according to methodical recommendations taken from V.N. Vasilenko's [1] and I.M. Nazarov's [3] works and the long-term experience of the Geoecology and Geochemistry Department workers (TPU).

The weight of dust in snow samples serves as a basis for determination of dust load magnitude Pn according to the formula:

Pn=P / (S • t), mg/m2 per day-and-night,

where P is the dust weight in a sample (mg),

S is the square of the test-pit ($m^2$),

t is the time from the beginning of snow staying (a day).

To assess the level of contamination the grading in pollution level in terms of the daily dust load magnitude was used [2]: Less than 250 is the low degree of pollution, harmless level of the population disease; 251-450 is the average degree of the pollution, relatively dangerous level of population disease; 451-850 is the high degree of the pollution, dangerous level of population disease; more than 850 is the very high degree of the pollution, extremely dangerous level of population disease.

In order to assess the levels of dust air pollution, dust load values were compared with data from the regional (480 km far from Tomsk) and local (70 km far from Tomsk) background sites.

Data analysis of the dust air pollution in the period from 2009 to 2013 showed that the overall value of the dust load in the vicinity of the industrial enterprises of Tomsk decreasing every year, except quantities of dust load in the affected area of brickyards received in 2013. The maximum values of the dust load from 2009 to 2013 were observed in the affected area of brickyards. Dust pollution peaks occur in the points located in the near field of enterprises impact (up to 400 m from the industrial sites of enterprises), the values of the dust load at these points correspond to the average level of contamination (251-450 mg/$m^2$ * day). However, in the distance from the territories of enterprises the degree of dust contamination is almost half reduced, and corresponds to the low level of contamination (values are less than 250 mg/$m^2$ * day).

Analysis of the data in 2013 showed that rate of dust load in the impacted areas of the industrial enterprises of Tomsk ranges from 27,5 to 96 mg/$m^2$ * day. The values of dust load in almost all investigated areas of the industrial enterprises in terms of the gradation offered by J.E. Saet, belong to the low degree of atmosphere pollution and harmless level of population disease for inhabitants living in this territory. An exception is the dust load in the impact zone of brick factories, which vary from 216 to 526 mg/$m^2$ * day.

**Table**

**The value of the average daily dust load in the impact areas of the industrial enterprises of Tomsk (2013), mg/m2*day**

| The impact area | Quantity of tests | Pn average | Pn min | Pn max |
|---|---|---|---|---|
| Reinforced concrete plants | 5 | 61 | 34 | 96 |
| Brick plants | 5 | 333 | 216 | 526 |
| Thermal power plant | 5 | 44 | 31 | 63 |
| Petrochemical plant | 5 | 39 | 27 | 58 |

Note: Pn average is the average magnitude of the dust load, Pn min is the minimum magnitude of the dust load, Pn max is the maximum magnitude of the dust load; the background (Central Vasyugan) is 7 mg/m2*day, the data from A.Yu. Shatilov, 2001.

References

1. Vasilenko V.N. Pollution monitoring snowpack / V.N. Vasilenko, I.M. Nazarov, Sh.D. Friedman. - Gidrometeoizdat, 1985 . - 185 p.
2. Environmental Geochemistry / Y.E. Saet , B.A. Revich , E.P. Yanin [ et al.] - Moscow: Nedra , 1990 . - 335 p.
3. Nazarov I.M. Using a network of snow surveys for the study of snow cover pollution / I.M. Nazarov, Sh.D. Friedman, O. Rennes // Meteorology and Hydrology . - 1978. - № 7. - pp. 74-78.