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ECOLOGY AND ENVIRONMENTAL PROTECTION

**30 June- 6 July, 2019
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- 90. THE EVALUATION OF THE IMPACT OF SOIL POLLUTION ON HUMAN HEALTH**, Professor, Doctor of Agricultural Sciences, Stepanova LP, Associate Professor, Candidate Of Biological Sciences, Pisareva AV, Associate Professor, Candidate Of Pedagogics, Nechushkin Yu V, Associate Professor, Candidate Of Agricultural Sciences, Myshkin AI, Russia 717
- 91. THE IMPACT OF HEAVY METALS ON THE SOIL-PLANT SYSTEM UNDER THE ANTHROPOGENIC LOAD**, Dinkelaker Natalia, Agakhanyants Polina, Mozal Ekaterina, Ulyanov Nikolay, Kiss Valeriy, Russia 725
- 92. THE RESEARCHES OF THE ELECTROMAGNETIC FIELD ON THE ACTIVATION OF COMBUSTION AND CHANGES IN THE COMPOSITION AND HYDROCARBON GASES.**, Dr. Boris Gusev, Dr. Stanislav Mikhailin, Dr. Vitaly Chelnokov, Dr. Andrey Glushko, Dr. Alexey Matasov, Russia 735
- 93. THE ROLE OF ANTHROPOGENIC AND NATURAL FACTORS IN THE HYDROECOLOGICAL STATE OF THE UPPER DNEIPER AND WESTERN DVINA**, Prof. Dr. Geogr. Sc. Valerian Snytko, Prof. Dr. Geogr. Sc. Vera Shirokova Cand. Geogr. Sc. Nadezhda Ozerova, Cand. Techn. Sc. Vassily Chesnov, Russia 743
- 94. THE ROLE OF SECONDARY OXIDES IN POTENTIALLY TOXIC ELEMENTS MIGRATION**, MSc. Bronislava Lalinská-Voleková, PhD., RNDr. Ivona Kautmanová, PhD. MSc. Darina Arendt, PhD. MSc. Dana Szabóová, PhD. MSc. Anežka Borčinová Radková, PhD. MSc. Ondřej Brachtýr, PhD. Slovakia 751
- 95. THEORETICAL AND EXPERIMENTAL MODEL OF THE COMBUSTION PROCESS IN A LAYER ON THE GRATE OF THE WASTE THERMAL TREATMENT INSTALLATION**, PhD Eng. Małgorzata Kajda-Szcześniak, PhD DSc Eng. Tomasz Jaworski, MSc. Eng. Agata Wajda, Poland 759
- 96. THERMAL LOADING OF PRESSURE CYLINDERS IN A FIRE**, Ing. Miroslav Mynarz, Ph.D., Ing. Vojtech Jankuj, Ing. Petr Lepik, Ph.D., Czech Republic 767
- 97. URBAN AREA PLANNING AND ENVIRONMENT IN KAZAKHSTANS CITIES: CASE OF ALMATY**, Zhannat Aliyeva PhD, Zhanna Assipova PhD, Madina Bazarbekova, Aizhan Mussagaliyeva PhD, Aigerim Sansyzbayeva, Kazakhstan 775
- 98. USE OF SPATIAL AND OPERATIONAL DATA TO ANALYZE CO2 PRODUCTION DURING THE FLIGHT IN THE DIFFERENT METEOROLOGICAL CONDITIONS**, Ing. Heliá Nemethova, Ing. Zuzana Zgodavova, Slovakia 782
- 99. USE OF THE BIOPILATO FOR REMOVAL OF RESIDUAL CONTAMINATION OF INDUSTRIAL DRAINS**, Dr. Alexey Matasov, Dr. Andrey Glushko Dr. Vitaly Chelnokov, Tatiana Avdeenkova, Svetlana Buleeva, Russia 791
- 100. UTILIZING THE STRUCTURE OF THE CARVER METHOD FOR COMPREHENSIVE RISK ANALYSIS IN BREWING.**, Ing. Jaroslav Slezak, Czech Republic 799
- 101. VERTICAL DISTRIBUTION OF COPPER AND LEAD IN URBAN CONTAMINATED SOIL FROM AREAS WITH INDUSTRIAL ACTIVITIES**, Dr. Adriana Ion, Ing. Ana Cosac and Nicolae C., Romania 807
- 102. WORLD POPULATION GROWTH, URBANIZATION AND TECHNOSPHERE PROBLEMS**, Prof. Dr. Alexander Lipaev, Candidate of Geological and Mineralogical Sciences Sergey Lipaev, Russia 815
- 103. SOYBEAN WASTE MATERIAL AS POTENTIAL ADSORBENT FOR HEAVY METAL IONS FROM AQUEOUS SOLUTIONS**, Lecturer PhD. Annette Madelene Dancila, Lecturer PhD. Oanamari Daniela Orbulet, Assoc. Prof. PhD. Cristina Modrojan, Lecturer PhD. Simona Caprarescu, Romania 823

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URBAN AREA PLANNING AND ENVIRONMENT IN KAZAKHSTAN'S

CITIES: CASE OF ALMATY

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ABSTRACT

The last century is characterized by rapid development of cities, agglomerations and urban areas. Urban space needs to serve a variety of human needs: housing, working, social interaction, leisure, and mobility of persons and goods. Human beings also need nature within their living areas; green spots for recreation and relaxation. Trees, parks and other greenery helps provide healthy living conditions by cleaning the air of pollutants, absorbing noise, and regulating humidity. Beyond this direct anthropocentric (human-centred) perspective, conservation of natural habitats is necessary for maintaining the functioning of ecosystems of all life on earth. Spatial planning of urban territory is the basis where are created buildings, street location, park system and others. Kazakhstan's major cities were built in 20th century during Soviet period. Capacity of the territory, streets, buildings were expected for 1960-ies. Accordingly, nowadays urban area is not ready to fulfil the modern needs of citizens. The aim of this paper is to provide information on transportation system of Almaty city in Kazakhstan, the environment condition, impact of transportation on ecology and to disseminate experiences in dealing with relationships between land-use structures and transport, and to discuss strategies to support the realization of more sustainable urban transport by land-use planning

Keywords: urban planning, environment, Kazakhstan, transport, urban ecology

INTRODUCTION

Urban space should serve a variety of human needs: housing, work, social interaction, leisure, and mobility of people and goods. Cities are places with a high level of accumulation and concentration of economic activity and are complex spatial structures supported by transportation systems. The spatial distribution of housing, work, shopping, leisure and other activities, determines the average distance in urban transport. The high population density, as well as the use of land use for various socio-economic activities, maintains a low distance between the origin and directions of urban travel. On the

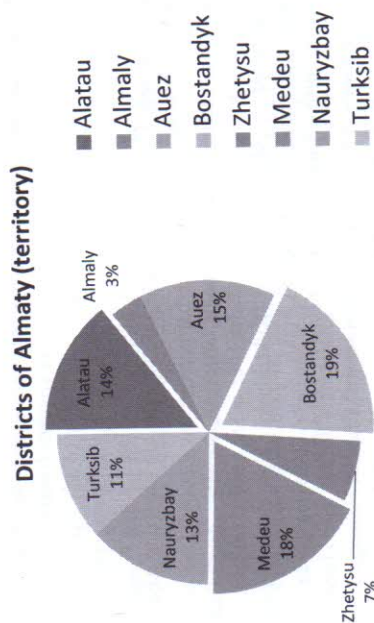


Figure 2 – Districts of Almaty by territory (2019)[8]

Analysis of the area, number of inhabitants and number of jobs based on statistical data revealed an uneven distribution of the population, which leads to greater movement of people and forms traffic flows within the city. The main reason for the movement is to get to work, study.

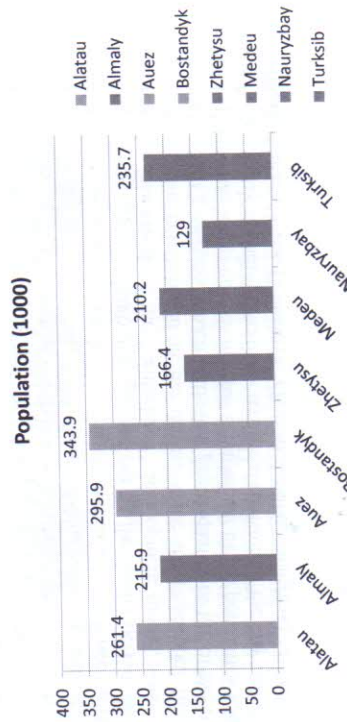


Figure 3 – The number of citizens by districts (2019)[8]

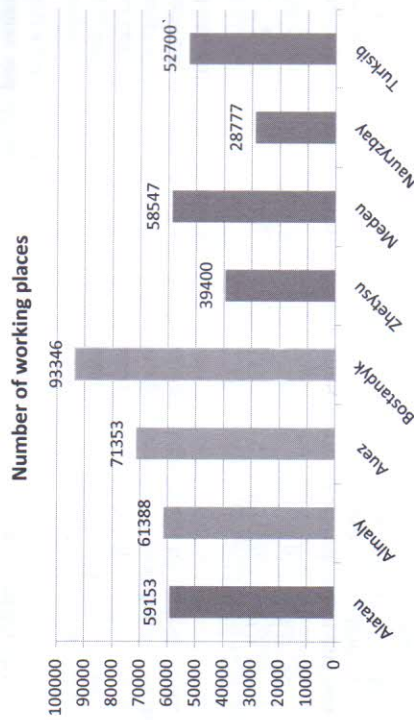


Figure 4 – The number of working places by districts (2019)[8]

People live in one district and move to work to another district. As you can see, in the figures 3-4. It can be seen that the main jobs are concentrated in the central areas of the city, where the main flow of people is sent in the mornings and evenings. All this increases the mobility of citizens, and, therefore, carries the load on the city's transport system, creating peak congestion. Almaty should be developed as the "distributed city", the best examples of which can be considered New York and Barcelona[9]. Within the framework of such a model, "points of attraction" are not simply formed outside the city center, but many self-sufficient cities are created inside a large city. Each cluster has the same number of services, services, jobs, like any other part of the system.

URBAN TRANSPORTATION AND ENVIRONMENTAL ISSUES IN ALMATY

Currently Almaty has a developed transport infrastructure, represented by various means of transport:

1. public buses;
2. public electric transport;
3. underground;
4. BRT (high-speed bus transport);
5. taxi;
6. Moto and bicycle transport[10].

So nowadays the Almaty has several urban problems as:

1. Traffic congestion: The sheer number of vehicles on city roads each day just carrying a single person on their daily commute to work is huge, and when added to the delivery trucks and vans, service vehicles, and buses and taxis out there driving each day, can lead to massive gridlock. It contributes to rising tensions, more fuel use, higher amounts of air

pollution, and slower commuting times, while also serving up the major challenge of finding a place to park most of those vehicles near their destinations.

2. Long commutes: Increased traffic, road construction, and a population that increasingly lives in one part of the city and works in another all contribute to longer commute times. Cities can address the issue through an evolution of their planning work to incorporate alternative transportation modes (such as biking and walking), supporting more walkable neighborhoods, and the better promotion and marketing of public transit options as a more productive alternative to driving.
3. Secondary infrastructure: The supporting element of ensuring adequate rider parking areas can be a boon to increased public transit usage, as park-n-ride stops allow for riders to leave their vehicles safely on the outskirts of a city and avoid parking hassles.
4. Sprawling cities: As many cities grow increasingly outward, urban and suburban sprawl places both residential and commercial real estate further away from the center, and this decentralization leads to not only increasingly complex transit and road systems, but also to long commutes and drive-time traffic woes. Some cities may choose to focus on an 'infill' development process to tighten up city centers, or to use strict zoning guidelines to keep industry and residential areas separated, but no matter the approach, the trend toward decentralization looks to continue.
5. Large fleets, large costs: Transit agencies in urban areas, which manage larger fleets of vehicles and more employees, have their challenges cut out for them in terms of keeping maintenance costs and tasks under control, as well as attracting, training, and retaining a skilled workforce, which contributes to increased safety and fewer lost-time accidents. The adoption of technology systems for better route scheduling, maintenance tracking, and employee scheduling can help reduce costs and downtime, as can the implementation of better tracking, mapping, and communications systems on the vehicles themselves [11]. Cities can help enable more efficient transit systems by partnering with agencies in planning processes, the sharing of resources (fueling and maintenance facilities), and pursuing forward-thinking solutions such as electric buses. More concrete, the transport infrastructure of the city of Almaty has a number of significant drawbacks:
 1. low density and lack of roads;
 2. low-quality road surface;
 3. old car park;
 4. big flow coming from the suburbs to the city of motor transport, including transit;
 5. irregularity of the routes;
 6. the presence of traffic congestion "traffic jams";
 7. violations of passenger and baggage transportation rules
 8. insufficient number of safe pedestrian crossings;
 9. low quality passenger service
 10. not enough thoughtful installation of traffic lights;
 11. lack of proper informational support for drivers and passengers;
 12. uncoordinated work of organizations (advertising, landscaping, etc.) leading to the creation of artificial traffic jams;

13. adverse effects on the ecology of the city (especially on the air) and noise pollution [12].

According to environmental problems the main environmental problem of the city is air pollution. About 18 thousand of harmful substances come from stationary sources into the air basin of the city, pollution emissions into the atmosphere from large heat and power facilities, from small and medium enterprises, including those with independent sources of heat supply [13]. It should be noted that the problem of air pollution by road transport remains the most important factor in the deterioration of the quality of atmospheric air (taking into account non-resident transport, emissions amount to about 190 thousand tons of harmful substances per year). Over the past 3 years, every third or fourth car has been operated with excess toxicity and smoke. Basically, these are vehicles with a service life of more than seven years. The problem of air pollution emissions of pollutants from industrial facilities and business entities with independent sources of heat supply, remains one of the most primary. The city has over 98 thousand private houses, of which 36277 have not yet been gasified, which in the cold period are a source of emissions of harmful substances into the surface layer of the atmosphere [14]. The main objectives of the regulation of relations in the field of waste management in the city of Almaty are: ensuring the environmental safety of the population of Almaty, protecting the environment from the harmful effects of waste; prevent the organization of waste dumps and littering of the territory of Almaty; obtaining finished products or extracting useful components when using (processing, recycling) waste; development of the market of secondary material resources and their involvement in economic circulation as secondary raw materials.

CONCLUSIONS

The problems of managing the city are closely related to the solution of transport problems, which become more acute with the growth of cities, the extension of labor trips, pendulum migrations and the increase in the number of vehicle owners; transport problems are the most typical problems of modern urban life. Every year the number of cars increases, and therefore the pollution of the environment by motor vehicles takes on a global catastrophic character, since the country's car park is characterized by high wear and tear - the proportion of vehicles in use for more than 12 years is 63%, including 57% of buses, 59% of cars and 84% of trucks. Urban transport system is characterized by three groups of variables: ensuring the mobility of the urban population; integrable by the system under study, determining the impact of the system on the environment and conditions characterizing the dynamic behavior of the system under study - urban traffic flow; all three groups of quantities are assumed to be functions of time [15]. Tasks of managing urban transport flows can be solved within the framework of the functioning of transport infrastructure management systems, since a systematic approach to solving problems of managing the transport infrastructure of a large city is ensured by the development and use of intelligent transport systems. Analysis of research in the field of the theory of traffic flows shows that a reliable determination of the average annual daily traffic intensity is impossible without taking into account the patterns of its change during the day, days of the week, seasons of the year. To increase the capacity of city streets and ensure a clear organization of movement, it is necessary to unify the rolling stock, make it more homogeneous, it allows you to distribute traffic on individual highways of the city and according to the degree of rolling stock impact on the environment (noise, vibration,

air pollution) transportation taking into account the functional zoning of the city, Kazakhstan legislation defines the basis for a more flexible transition to new approaches in transport planning at the level of oblasts, the cities of Astana and Almaty - without explicitly providing for such an opportunity at the level of subordinate local executive bodies.

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USE OF SPATIAL AND OPERATIONAL DATA TO ANALYZE CO2 PRODUCTION DURING THE FLIGHT IN DIFFERENT METEOROLOGICAL CONDITIONS

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ABSTRACT

The article deals with the impact of global climate change and temperature warming up on emission production during en-route flight. Consequently, analyses the effects of carbon dioxide gases production on the environment and ecology. The main aim of this article is to do research the amount of emission (CO2) production during flight in different meteorological condition and make an evaluation of how it can affect the global climate change, ecology and greenhouse effect. The theoretical part of the article focused on monitoring, analyzing and map out the global climate and emission gases production change. The practical part of the paper includes calculations, system analysis, and CO₂ emission gases production modelling during the en-route flight of the selected type of aircraft. The result of the research is a response to the issue: how can the global climate change influence the fuel burn and emission gases production, and how can the emission production contribute to the greenhouse effect and Earth's ecology and environment. The fuel consumption and emission production calculations are processed on the bases of the AFM (Aircraft Flight Manual), OM (Aircraft Operation Manual) and Dr. Christian N. Jardine research study program methods.

Keywords: fuel consumption, aircraft operation and performance, carbon dioxide emission production, global climate change, temperature warming up

INTRODUCTION

The global climate change, greenhouse gases production and temperature warming up is a very actual, important and disputable topic in recent days. It has a big impact on the Earth's economy, ecology, fauna and flora and on the whole population. The previous studies show the fact that temperature is warming up, the climate is changing, and in recent years these changes are greater. [1,2,3,4]

NASA claims that: "Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animals ranges have shifted and trees are flowering sooner." [5]

Scientists have confidence that the global temperature warming up will continue to rise due to the greenhouse gases produced by human activities. To the human activities belong the aircraft's emission production, which has also a negative impact on the Earth's ecology.