Vital Annex: International Journal of Novel Research in Advanced Sciences (IJNRAS)
Volume: 02 Issue: 10 | 2023
http://innosci.org/

Finding the Best Solutions for Air Heating and Ventilation Systems

Behzod Turdikulov
Jizzakh Polytechnic Institute, Engineering communications, assistant of the department

Abstract: Ventilation and heating systems of industrial enterprises are important and sometimes the main consumers of heat and electricity. Therefore, reducing the energy consumption of heating and ventilation systems reduces the cost of the manufactured product and, accordingly, increases its competitiveness. The sanitary and hygienic aspect of the problem cannot be ignored. Unfavorable working conditions, in particular, increased dust and gas pollution in workplaces, lead not only to a decrease in labor productivity, but also to the appearance of occupational diseases among workers, often resulting in disability after 15-20 years of work. Without effective ventilation, enterprises cannot obtain the ISO 9000 international quality certificate.

Keywords: Electricity, air, heating, ventilation, systems, ventilation systems.

Introduction

The method of regulating air conditioners according to optimal modes A.Ya. Kreslin. According to the proposed method, the external climate zone according to the J-d diagram is divided into certain zones, and for each of them, the most economical technological schemes of air conditioning systems are determined for the selected control principle, which allows to make rational decisions not only for objects will give. calculation cycles (cold, transition and hot), but also for the intermediate state of the outside air.

Functional and technological indicators are crucial, because firstly, without providing the necessary parameters of the air environment, it makes no sense to take into account other indicators, let alone compare the systems with each other; secondly, information on heat, cold, water and air consumption allows for the selection of technical means and, therefore, allows to determine the quantitative values of the indicators of the remaining groups.

Structural and layout indicators refer to the price of the metal, the areas required to provide the appropriate functional and technological indicators. Performance indicators describe the consumption of heat and electricity, reliability of systems. Economic indicators - capital, operating and reduced costs for the ventilation and air cleaning system, presented in monetary terms. A.A. Rymkevich suggested that through optimization "understand the minimization of a group of indicators (or its specific value) that is decisive for certain optimization motives." In this regard, the concept of minimum-inevitable values for each group of indicators is introduced.

A.A. Rymkevich created a thermodynamic model of air cleaning processes in air conditioning systems. The construction of the thermodynamic model is based on the placement of three polygons on the J-d diagram, which respectively describe the allowed indoor air parameter fields, the minimum and maximum possible outdoor air flow. Depending on the position of these polygons determined by heat and moisture loads, buildings are divided into four classes, and the external climate zone is divided into zones obtained an equation reflecting the minimum unavoidable costs of heat, cold, water and air. These costs do not depend on regulatory principles, but are a function of the values given or assumed as inputs. Using the resulting equations, discounted cost graphs for various air conditioning systems can be constructed.

Some attention is paid to the choice of optimal solutions for ventilation and heating systems abroad. For example, a group of American experts led by V. Stocker is engaged in optimization of engineering systems, including ventilation systems. The task includes choosing a combination of air ducts, choosing a fan, optimal monitoring of the system according to the construction plan.

More extensive tasks include an automated design system developed by S. Kawamoto, W. Yumesi, T. Kazahara. This system provides the calculation of the thermal regime of the building, the selection of air diffusers and the selection of equipment. At the same time, the necessary materials are calculated and the price of the system is determined.

In search of optimal solutions, Australian experts solve the problems of choosing heat insulation, massiveness, coloring of the building, its placement and orientation together with architectural requirements.

Thus, the wide application of optimization principles and automated calculation programs in the design practice improves the technical and economic performance of ventilation and heating systems.

To create a mathematical model of the ventilation process, it is necessary to analyze the works devoted to the study of air distribution systems. The creation of systems calculation methods air distribution is dedicated to a large number of works.

L.S.Klyachko, I.L.Ganes and L.B.Uspenskaya developed a method of calculating various air parameters of air parameters at the workplace and at the exit from the inlet nozzle based on the obtained empirical relationships. air distribution methods, in which the state of the air environment in the workplace is evaluated according to average indicators. Emphasizing the importance of the work done, we note that the selected assessment principle is apparently not complete enough, because in many rooms the air parameters are characterized by a certain unevenness of the values in the workplace. First, they deviate from the average values of speed and temperature at the point of introduction of supply streams into the working zone, but according to research. L. B. Uspenskaya used a statistical method to process experimental data on the distribution of temperature-velocity fields obtained as a result of modeling different rooms. The author found that the law of distribution of temperature and concentration of harmful substances with concentrated sources of heat and gas emissions coincides with and differs from the law of distribution of velocities. Note that the laws obtained in the work are valid only for simulated buildings, and it is very difficult to generalize the research results to other objects. In order to create a mathematical model of the ventilation process, it is desirable to use this special approach, which allows the description of aerodynamic processes using analytical relations, in the calculation of air distribution systems. According to this approach, production facilities are divided into three classes:

Class I - rooms in which air circulation is determined by supply flows

Class II - rooms where air circulation is determined by strong convective currents over hot equipment;

Class III - rooms in which the dominant factor affecting the formation of fields of velocities, temperatures and concentrations cannot be distinguished.

A mathematical model of the ventilation process can be created for buildings of the first two classes, because currently there are no analytical patterns for buildings of the third class to describe the temperature-velocity fields.

Basics for calculating air distribution and, first of all, in first-class industrial buildings V.V. Baturin and V.V. Khanjonkov's work "Air circulation in the room depending on the location of the supply and exhaust holes" [19], according to the results of the study on models, it is shown that it is several times more than the mass. supply and exhaust air participate in air circulation. It was also noted that the nature of the flow circulation is mainly determined by the supply jets. Therefore, most of the subsequent work on air distribution was carried out based on the study of the laws of jet streams and closely related to them. A great contribution to the development of the theory of free ventilation flows G.N. Abramovich, V.V. Baturin, SE. Butakov, M.I. Grimitlin, V.N. Of great importance for ventilation and heating technology is the study of jet flows developing in a limited space (confined flows). The laws of limited ventilation flows were studied mainly experimentally to justify the method of calculating concentrated air supply with horizontal flows. This method of air distribution was studied in our country earlier than others. V.A. Bakharev and V.N. Troyanovsky As a result of the generalization of the previously existing H.H. Using the materials of Sadovskaya and their research on limited jets, they proposed empirical relationships for determining the air velocity and flow in the jet and in the reverse flow and other parameters necessary for the calculation of this method of air distribution. In order to be able to obtain the general structure of the dependences calculated for ventilation flows, M.I. Grimitlin proposed to determine the velocities Vcm in confined flow and Vabr in reverse flow using the same formulas as the velocities in free flow Vvv, where the appropriate restriction factor (velocity or velocity ratio in the flow) was introduced. reverse flow) at a certain distance from the outlet openings to the velocity along the free stream axis at the same distance from the air distributor.

(К$стVстV$св;Кобр=VобрVсв) The author determined the values of these coefficients. I.L. Previously, on the basis of experimental studies of air delivery through horizontal flows through various fan grids, he concluded that the range of a limited jet depends on its (jet) output ability and, therefore, its type. air diffuser.

I.L. On the basis of earlier experimental studies of air delivery through horizontal flows through various fan grids, he concluded that the range of a limited jet depends on its (jet) discharge capacity and, therefore, its type. air diffuser.

O.N. Timofeeva and G.S. Promissory notes. In the works of a number of researchers (M.Z. Pechatnikova, N. Shvenko, V. Regenshteit) the effect of various obstacles, including the filling of the room with equipment, on the limited jet flight distance was considered. Although the results of the work are mainly qualitative, if the unit occupies less than 15% of the cross-sectional area of the ventilated room, it can be considered that the filling effect can be neglected for engineering calculations. At the same time, theoretical studies were conducted through the experimental study of ventilation flows developing in a limited space. K. L. Shepelev and M. L. Tarnopolsky put forward the premise that in a limited jet there is a "shift" of the speed by a certain value that is constant for each section compared to the free jet, and they obtained analytical relationships for calculating the concentrated feed.

The work of M. I. Grimitlin and G. M. Pozin was devoted to the study of the effect of the location of the exhaust holes on the limited flow and reverse flow on the speed. The authors analytically obtained the correlations to determine the coefficients of restriction in flow and dead circuits using the above-mentioned method of "shifting" the velocities. Based on the obtained relations, it was shown that the influence of the motion scheme (location of the exhaust hole) can be neglected in the ratio of $\sqrt{Fndo}$>7 (for axisymmetric flows) and Hbo>80 for plane flows.

Considering the analytical solutions of jet flows developing in a limited space, it is impossible not to note the work of P. Nilson. For the case of concentrated supply with non-depositing flows in the room without heat release, the author wrote a system of five partial differential equations describing the air movement in the room and solved them by numerical methods. For the jet problem, stream functions and isotherms that satisfactorily fit the experimental data could be obtained.

Conclusion

In the industry, there are such areas, which in the process of the technological process, the factors that drastically affect human health (occupational diseases) create technical problems that must be solved before the engineers. Air heating, ventilation and humidification of dry air are included. Therefore, it is appropriate to correctly choose the methods of designing optimal air exchange and moderation systems in workshops. Analyzing the above-mentioned methods, it should be noted that, taking into account the advantages and disadvantages of the methods, it is necessary to work on the most optimal methods and systems. I consider it one of the urgent issues of us engineers to apply the methods of reusing organic solvents instead of releasing them into the atmosphere, catalyzing them and cleaning them with hydrofilters.

List of references

1. Мусаев Ш. М. ЭКСПЕРИМЕНТАЛЬНОЕ ОПРЕДЕЛЕНИЕ ЗНАЧЕНИЙ КОЭФФИЦИЕНТА ГИДРАВЛИЧЕСКОГО СОПРОТИВЛЕНИЯ ДЛЯ ОРОСИТЕЛЬНЫХ ЛОТКОВ ИЗ КОМПОЗИТНОГО МАТЕРИАЛА //Current approaches and new research in modern sciences. – 2022. – Т. 1. – №. 4. – С. 49-54.
2. Мусаев Ш. М. МЕТОДЫ ГИДРАВЛИЧЕСКОГО РАСЧЕТА ОРОСИТЕЛЬНЫХ ЛОТКОВ ТИПА ЛК-60, ЛК-80 И ЛК-100 ИЗ ПОЛИЭФИРНОЙ СМОЛЫ //Theoretical aspects in the formation of pedagogical sciences. – 2022. – Т. 1. – №. 5. – С. 190-195.
3. Ernazarovich M. I. et al. Development Of A High-Performance Technology For Mixing Ozone With Water For The Preparation Of Drinking Water From The Reservoir //Journal of Positive School Psychology. – 2022. – С. 2921-2925.
4. Ilkhomjon Mahmudov, Umidjon Sadiev, Khurshid Lapasov, Azizbek Ernazarov, Shokhrukh Rustamov. Solution of the Filter Flow Problem by Analytical and Numerical Methods. Cite as: AIP Conference Proceedings 2432, 040006 (2022); https://doi.org/10.1063/5.0090359 Published Online: 16 June 2022 040006-01 – 040006-5

5. Ilkhomjon Mahmudov , Umidjon Sadiev, Shokhrukh Rustamov. Basic Conditions for Determining the Hydraulic Resistance to Friction in a Pipeline when a Mixture of Water and Suspended Sediments Moves. Cite as: AIP Conferenge Proceedings 2432, 040005 (2022); https: //doi.org /10.1063 / 5. 0090349 Published Online: 16 June 2022 040005-1 – 040005-9
6. Ergashev R. et al. Reducing vibration of pumping units of reclamation systems //E3S Web of Conferences. – EDP Sciences, 2023. – Т. 365. – С. 03021.
7. Махмудова Д. Э., Алиев М. К., Мусаев Ш. М. Анализ аварийных ситуаций на сетях водоотведения города Ташкента //Science and Education. – 2022. – Т. 3. – №. 12. – С. 411-421.
8. Ernazarovich I. Mahmudov, Aliev Mahmud Kuvatovich, Mahmudova Dildora Ernazarovna, Musayev Sharof Mamarajabovich, Rustamova Mukhlisa Muhtaralievna, Nematov Davlat Berdiyor o'g'li, Boboyorov Bekhruz Ixtiyor ug'li. Development Of A High-Performance Technology For Mixing Ozone With Water For The Preparation Of Drinking Water From The Reservoir //Journal of Positive School Psychology. – 2022. – Т. 6. – №. 5. – С. 2921-2925.
9. Бобоев С. М., Тоштемиров М. Э., Исмоилов А. И. АККУМУЛЯТОРЫ ТЕПЛОТЫ ФАЗОВОГО ПЕРЕХОДА В СИСТЕМАХ ВЕНТИЛЯЦИИ И КОНДИЦИОНИРОВАНИЯ ВОЗДУХА //Vestnik Volgogradskogo Gosudarstvennogo Arhitekturno-Stroitelnogo Universiteta. Seriya: Stroitelstvo i Arhitektura. – 2022. – №. 88.
10. Turdiqulov B. GAZ YONDIRGICHLARNING ISHLASH JARAYONINI TAKOMILLASHTIRISH //Eurasian Journal of Academic Research. – 2022. – Т. 2. – №. 11. – С. 4-11.
11. Turdiqulov B., Nazirov S., Karimov Y. ATOM VA MOLEKULALARNING YORUG'LIKNI YUTISHI VA NURLANISHI //Eurasian Journal of Academic Research. – 2022. – Т. 2. – №. 13. – С. 1252-1258.
12. O'G'Li S. O. R. et al. Aholini ichimlik suvi bilan ta'minlash muammolari //Science and Education. – 2022. – Т. 3. – №. 12. – С. 369-375.
13. Turdiqulov B. Improvement of the Operation Process of Gas Burners //Vital Annex: International Journal of Novel Research in Advanced Sciences. – 2023. – Т. 2. – №. 3. – С. 1-5.
14. Turdiqulov B., Egamberdiyeva X. TOG'-QAZISH SNOAATIDA YER USTI SUVLARINI TOZALASH MUAMMOLARINING HOZIRGI HOLATI //Евразийский журнал академических исследований. – 2023. – Т. 3. – №. 3 Part 2. – С. 119-127.
15. Turdiqulov B. Improvement of the Operation Process of Gas Burners //Vital Annex: International Journal of Novel Research in Advanced Sciences. – 2023. – Т. 2. – №. 3. – С. 1-5.
16. Turdiqulov B., Ismoilov A., Shahobiddin H. The Role of Ventilation in the Production of Various Clothing Materials //Vital Annex: International Journal of Novel Research in Advanced Sciences. – 2023. – Т. 2. – №. 4. – С. 124-133.

17. Арипов Н.Ю. Транспортировка бытовых отходов с применением гидравлических систем //Science and Education. – 2020. – Т. 1. – №. 6.
18. Арипов, Н.Ю. (2020). Транспортировка бытовых отходов с применением гидравлических систем. Science and Education, 1(6).
19. Такабоев К. У., Мусаев Ш. М., Хожиматова М. М. Загрязнение атмосферы вредными веществами и мероприятие их сокращение //Экология: вчера, сегодня, завтра. – 2019. – С. 450-455.
20. Мусаев Ш. М., Саттаров А. Умягчение состав воды с помощью реагентов //Me′ morchilik va qurilish muammolari. – 2019. – Т. 23.
21. Mahmudov I. E. et al. Probability-Statistical Model Of Reliability And Efficiency Of Irrigation Channels //Journal of Positive School Psychology. – 2022. – С. 2956-2960.
22. Мусаев Ш. М. и др. НАСОС АГРЕГАТЛАРИНИ ҲОСИЛ БЎЛАДИГАН ГИДРАВЛИК ЗАРБЛАРДАН ҲИМОЯЛАШ УСУЛЛАРИ ТАДҚИҚ ЭТИШ //Science and Education. – 2021. – Т. 2. – №. 3. – С. 211-220.
23. Такабоев К. У., Мусаев Ш. М., Хожиматова М. М. ЗАГРЯЗНЕНИЕ АТМОСФЕРЫ ВРЕДНЫМИ ВЕЩЕСТВАМИ И МЕРОПРИЯТИЕ ИХ СОКРАЩЕНИЕ //Экология: вчера, сегодня, завтра. – 2019. – С. 450-455.
24. Sultonov A. et al. Pollutant Standards for Mining Enterprises. – 2021.
25. Махмудова Д. Э., Мусаев Ш. М. Воздействие промышленных загрязнителей на окружающую среду //Академическая публицистика. – 2020. – №. 12. – С. 76-83.
26. Мусаев Ш. М. Мероприятие сокращение загрязнение атмосферы вредными веществами //Me′ morchilik va qurilish muammolari. – 2020. – С. 45.