Pro Index | Journal of Integrity in Ecosystems and Environment

Volume: 1 Issue: 4 Year: 2023

http://journals.proindex.uz

Using Local Raw Wool as a Thermal Insulation Material for Wall Construction

Khakimov Sodiqjon Rasuljon o'g'li
Trainee teacher at Namangan Construction Engineering Institute

Jalolov Zayniddin
Senior teacher at Namangan Construction Engineering Institute

Abstarct: As a result of calculations, effective aspects of using animal wool (sheep's wool) as a thermal insulation material for wall structures of buildings today were determined.

Key words: animal hair, insulating materials, wall, internal temperature, energy efficiency.

Introduction. Currently, the use of energy-saving materials in buildings serves to maintain the natural ambient temperature of the room. In this regard, a lot of work is being done in the construction sector of our country. As the population's demand for housing increases, the construction of buildings and structures has developed significantly. This causes a sharp increase in demand for building materials. Nowadays there are a lot of materials for recycling. But among them there is a very high demand for energy-saving building materials. The production of energy-efficient building materials requires a lot of labor, and for this it is necessary to have a raw material base. In economic terms, energy-efficient building materials are more expensive among building materials. With this in mind, it is now necessary to produce construction materials using local waste raw materials. This, in turn, satisfies the demand for the use of cheap and convenient materials. Based on the above, we will consider recommendations for obtaining energy-efficient materials using coarse animal wool (sheep's wool) and using such materials in wall construction.

Materials and methods. Animal wool (sheep's wool) is considered waste today. The wool of this animal was used as felt in places where people engaged in animal husbandry lived in ancient times. Wool is an ancient fibrous material. This material also protects animals from external temperatures. The wool of other animals is also widely used in clothing.

Animal wool (sheep's wool wrapper and internal structure

Due to the porosity of the material, it is lightweight and has low thermal conductivity. It is also an environmentally friendly material. Animal wool can be used in the following parts of buildings and structures:

- As a heat-preserving material on the internal and external surfaces of walls of buildings and structures;
- To prevent heat loss in wooden houses between beams, i.e. in roof structures;
- Reconstruction of old buildings;
- In order to conserve heat that may be lost due to small and medium-sized room structures;
- As a technical insulating material and another.

Research result. Let's consider the use of animal wool as a heat-preserving material in the construction of walls. The use of animal hair on the internal facade as a thermal insulation material in the construction of walls of residential buildings is considered.

We calculate the thickness of thermal insulation material for a residential building

Estimated temperature of the five coldest days $t_н$=*-39* ^0C.

Average temperature of the heating season t_{cp}=*-8,2* ^0C

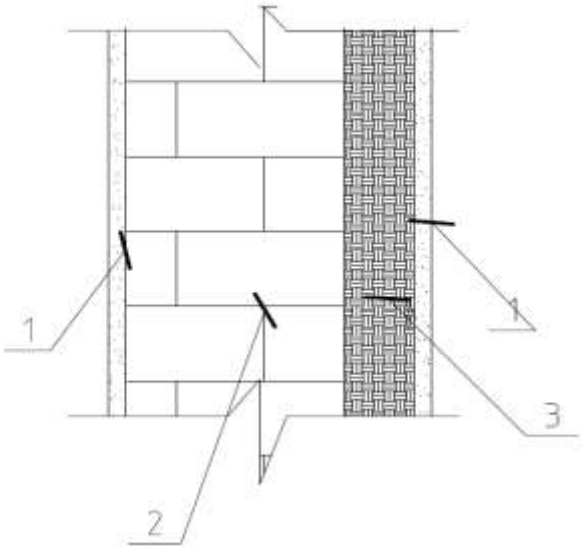
Duration of the heating season – *235 дней.*

Approximate room temperature – t_v=*24* ^0C

Relative indoor air humidity; p_h=*55%*

Room humidity mode – *normal*

Room humidity zone – *dry*



Sectional sketch of the wall. 1-Cement-sand mixture; 2-layer of ceramic porous brick; 3-Insulation made from animal hair.

Thermal characteristics of materials.

№	Name of the material.	Densities Kg/m^3	Thickness, m.	Thermal conductivity, W/(m.C)	P=b/l, W/(mS)
1	Cement-sand mixture	1800	0.02	0.76	0.026
2	Layer of ceramic porous brick	1400	0.38	0.52	0.073
3	Animal wool insulation	150	b3	0.033	b/0.033

Based on this information, let's look at the basics of calculation.

The required thermal conductivity of a residential building should be determined from energy saving conditions depending on the degree days of the heating period.

GSOP= (t_v- t_{ot}. lane.) zot.per = (24-(-8.2))·235 = 7567

As a result, we obtain $R_н$=3.72 (m^2*^0C/W) the calculated resistance of the walls of residential buildings according to GOST.

The total thermal resistance of the enclosing structure is found by the formula: $R_0=R_v+R_k+R_h=1/a_b+R_1+R_2+R_3+ 1/a_h$;

a_b – heat transfer coefficient of the inner surface of the walls – 8.7 W/(m^2*^0C);

a_h – heat transfer coefficient for the outer surface of the walls – 23 W/(m^2*^0C);

R_0=1/8,7+0,026+0,73+b_3/0,033+1/23=3,72

b_3=0,0927;

Taking brickwork as a module, we will take the thickness of animal hair to be equal to 0.093 m. Let us perform a control calculation of the total thermal resistance of the structure:

R_0 = 1/8,7 + 0,026 + 0,73 + 0,093/0,033 + 1/23 =3,73 R_o = 3,73 > R_0 tr= 3,73.

As can be seen from the result, the thickness of the unknown wall insulation layer should be 9.3 cm.

Conclusion. According to calculations, a thickness of 9.5 cm is enough for the wall structure to maintain normal temperature. The room temperature is only 24 degrees.

References:

1. Khakimov, S., & Khamidov, A. (2023). MODERN CONSTRUCTION OF THERMAL MATERIAL STORAGE. *Journal of Sustainability in Integrated Policy and Practice*, *1*(3), 1-5.
2. Шаропов, Б. Х., Хакимов, С. Р., & Рахимова, С. (2021). Оптимизация режимов гелиотеплохимической обработки золоцементных композиций. *Матрица научного познания*, (12-1), 115-123.
3. Хакимов, С., Шаропов, Б., & Абдуназаров, А. (2022). Бино ва иншоотларнинг сейсмик мустаҳкамлиги бўйича хорижий давлатлар (россия, япония, хитой, ақш) меъёрий хужжатлари таҳлили. *barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali*, 806-809.
4. Khakimov, S. R., & Sharopov, B. K. (2023). Educational Quality Improvement Events Based on Exhibition Materials in Practical Training Lessons. *American Journal of Language, Literacy and Learning in STEM Education*, *1*(2), 5-10.
5. Абдужабборов, А. А. У., & Хакимов, С. Р. У. (2023). ИССЛЕДОВАНИЕ СТЕПЕНИ РАСПРОСТРАНЕНИЯ В ГРУНТАХ ВИБРАЦИЙ, СОЗДАВАЕМЫХ ДВИЖЕНИЕМ ГРУЗОВОГО АВТОМОБИЛЯ. *ТЕСНика*, (1 (10)), 10-17.
6. Khakimov, S., & Choriyeva, V. (2023). THE PLACE AND SIGNIFICANCE OF INCLUSIVE EDUCATION IN MODERN EDUCATIONAL PROCESSES. *Евразийский журнал предпринимательства и педагогики*, *1*(1), 116-118.
7. Yuldashev, S. H., & Xakimov, S. (2022). ABOUT VIBRATION ARISING FROM RAILWAY TRANSPORT. *Science and Innovation*, *1*(5), 376-379.
8. Хакимов, С. (2022). ТОННЕЛЛАР ҚАЗИШНИНГ САМАРАЛИ УСУЛЛАРИ ВА УЛАРНИ КАМЧИЛИКЛАРИ. *Journal of Advanced Research and Stability*, *2*(9), 219-222.
9. Хамидов, А., Хакимов, С., & Тургунбаева, М. (2023). СТРОИТЕЛЬНЫЕ МАТЕРИАЛЫ НА ОСНОВЕ ЗОЛО-ШЛАКОВЫХ ЩЕЛОЧКОВ. *ТЕСНика*, (2 (11)), 1-4.

10. Хакимов, С., & Чориева, В. (2023). ИСПОЛЬЗОВАНИЕ МЕСТНОЙ ШЕРСТИ-СЫРЦА В КАЧЕСТВЕ ТЕПЛОИЗОЛЯЦИОННОГО МАТЕРИАЛА ДЛЯ СТРОИТЕЛЬСТВА СТЕН. *Центральноазиатский журнал академических исследований*, *1*(2), 38-41.
11. Хакимов, С., & Тургунбаева, М. (2023). ИСПОЛЬЗОВАНИЕ ОПЫТА ЯПОНИИ, США И ГЕРМАНИИ В ПОВЫШЕНИИ КАЧЕСТВА ВЫСШЕГО ОБРАЗОВАНИЯ. *ТЕСНика*, (2 (11)), 17-19.
12. Холмирзаев, С., Аҳмедов, И., Адҳамжон, Ҳ., Ризаев, Б., Умаров, И., & Хакимов, С. (2022). ҚУРУҚ ИССИҚ ИҚЛИМЛИ ШАРОИТЛАРДА ҚУРИЛГАН ВА ФОЙДАЛАНАЁТИЛГАН БЕТОНЛИ ВА ТЕМИР БЕТОН КОНСТРУКЦИЯЛАРНИ ҲОЛАТИ. *Journal of new century innovations*, *19*(7), 180-190.
13. Хакимов, С. (2023). ПОВТОРНОЕ ИСПОЛЬЗОВАНИЕ ВОДЫ В АВТОМОЙКАХ ПУТИ МАРШРУТИЗАЦИИ. *ТЕСНика*, (1 (10)), 1-5.
14. Ризаев, Б., Ахмедов, И., Хамидов, А., Холмирзаев, С., Хакимов, С., & Умаров, И. (2022). ЖАҲОНДА КИЧИК ГЭСЛАРНИ РИВОЖЛАНТИРИШНИНГ ҲОЗИРГИ ЗАМОН АНЪАНАЛАРИ. *Journal of new century innovations*, *19*(8), 110-119.
15. Ризаев, Б., Ахмедов, И., Хамидов, А., Холмирзаев, С., Хакимов, С., & Умаров, И. (2022). ВЛИЯНИЯ ТЕМПЕРАТУРНО-ВЛАЖНОСТНОГО РЕЖИМА НА ВОДОПОГЛОЩЕНИЕ ЛЕГКИХ БЕТОНОВ НА ПОРЫСТЫХ ЗАПОЛНИТЕЛЯХ. *Journal of new century innovations*, *19*(8), 192-201.
16. Khamidov, A., & Khakimov, S. (2023). MOISTURE LOSS FROM FRESHLY LAID CONCRETE DEPENDING ON THE TEMPERATURE AND HUMIDITY OF THE ENVIRONMENT. *Science and innovation*, *2*(A4), 274-279.
17. Khamidov, A. I., & Khakimov, S. (2023). Study of the Properties of Concrete Based on Non-Fired Alkaline Binders. *European Journal of Geography, Regional Planning and Development*, *1*(1), 33-39.
18. Kholmirzayev, S., Akhmedov, I., Khamidov, A., Umarov, I., Dedakhanov, F., & Hakimov, S. (2022). USE OF SULFUR CONCRETE IN REINFORCED CONCRETE STRUCTURES. *Science and innovation*, *1*(A8), 985-990.
19. Kholmirzayev, S., Akhmedov, I., Rizayev, B., Akhmedov, A., Dedakhanov, F., & Khakimov, S. (2022). RESEARCH OF THE PHYSICAL AND MECHANICAL PROPERTIES OF MODIFIED SEROBETON. *Science and innovation*, *1*(A8), 1009-1013.
20. Akhmedov, I., Khamidov, A., Kholmirzayev, S., Umarov, I., Dedakhanov, F., & Hakimov, S. (2022). ASSESSMENT OF THE EFFECT OF SEDIBLES FROM SOKHSOY RIVER TO KOKAND HYDROELECTRIC STATION. *Science and innovation*, *1*(A8), 1086-1092.
21. Kholmirzayev, S., Akhmedov, I., Khamidov, A., Yusupov, S., Umarov, I., & Hakimov, S. (2022). ANALYSIS OF THE EFFECT OF DRY HOT CLIMATE ON THE WORK OF REINFORCED CONCRETE ELEMENTS. *Science and innovation*, *1*(A8), 1033-1039.
22. Yuldashev, S., & Xakimov, S. (2022). ТЕМИР ЙЎЛ ТРАНСПОРТИДАН КЕЛИБ ЧИҚАДИГАН ТЕБРАНИШЛАР ҲАҚИДА. *Science and innovation*, *1*(A5), 376-379.
23. Хакимов, С. (2022). АКТИВ ВА ПАССИВ СЕЙСМИК УСУЛЛАРИ ҲАМДА УЛАРНИНГ АСОСИЙ ВАЗИФАЛАРИ. *Journal of Integrated Education and Research*, *1*(2), 30-36.
24. Ювмитов, А. С., & Хакимов, С. Р. (2020). Исследование влияния сейсмоизоляции на динамические характеристики ЗДАНИЯ. *Acta of Turin Polytechnic University in Tashkent*, *10*(2), 14.
25. Yuvmitov, A., & Hakimov, S. R. (2021). Influence of seismic isolation on the stress-strain state of buildings. *Acta of Turin Polytechnic University in Tashkent*, *11*(1), 71-79.

26. O‘g‘Li, S. B. X., & O‘g‘Li, M. F. R. (2022). Quyosh energiyasidan foydalanib turar joy binolari qurishning istiqboli tomonlari. *Механика и технология*, (Спецвыпуск 1), 145-149.

27. Мухамедов, Д., & Махмудов, Ф. (2023). ОБОСНОВАНИЕ ПАРАМЕТРОВ КАТКОВ АГРЕГАТА ДЛЯ ПОСЕВА ОЗИМОЙ ПШЕНИЦЫ В МЕЖДУРЯДИЯ ХЛОПЧАТНИКА. *International Bulletin of Applied Science and Technology*, *3*(5), 478-483.

28. Шаропов, Б. Х. Ў., Ўғли, М. Ф. Р., & Акбаралиев, Х. Х. Ў. (2022). Қуёш энергиясидан фойдаланиб биноларни энергия самарадорлигини ошириш тадбирлари. *Механика и технология*, *2*(7), 186-191.

29. Фахриддин, М., & Сайфуллаевич, К. К. (2023). ВЛИЯНИЕ ДЛИНЫ ПРИВОДА ПАРАЛЛЕЛОГРАММНОГО МЕХАНИЗМА УСТРОЙСТВА ИЗМЕРЕНИЯ РАБОЧЕЙ ГЛУБИНЫ ПОЧВОБРАБАТЫВАЮЩИХ МАШИН НА ТОЧНОСТЬ ИЗМЕРЕНИЯ РАБОЧЕЙ ГЛУБИНЫ.

30. Шухратджон, Б., & Факсриддин, М. (2023). ПОКАЗАТЕЛИ ЭФФЕКТИВНОСТИ В СЕЛЬСКОМ ХОЗЯЙСТВЕ.

31. Абдувахобов, Д. А., Мадрахимова, М., Имомов, М., & Махмудов, Ф. (2022). РАЗМЕЩЕНИЯ ЗУБЬЕВ НОВОЙ ЗУБОВОЙ БОРОНЫ И ОПРЕДЕЛЕНИЕ ШИРИНЫ ИХ МЕЖДУСЛЕДИЯ. In *Инновации в сельскохозяйственном машиностроении, энергосберегающие технологии и повышение эффективности использования ресурсов* (pp. 76-80).

32. O‘G‘Li, A. A. S. (2023). Avtomobil yo’llaridagi lyossimon gruntlarning suv shimgan holida deformatsiyalanishi va seysmik to ‘qinlarni tarqalishini tahlil qilish. *Строительство и образование*, *1*(3), 60-65.

33. Abdunazarov, A. (2022). BO’LADIGAN TEBRANISHLARNI BINOGA TA’SIRINI ANIQLASH VA KAMAYTIRISH CHORALARINI TAKOMILLASHTIRISH. *Science and innovation*, *1*(A5), 380-384.

34. Abdunazarov, A. S. (2022). AVTOMOBILLAR XARAKATIDAN HOSIL BO ‘LGAN TEBRANISHLARNI KO ‘P JINSLI GRUNTLARDA TARQALISH JARAYONIGA OID TADQIQOTLAR TAHLILI. *Scienceweb academic papers collection*.

35. Abdunazarov, A. (2022). AVTOMOBILLAR HARAKATIDAN HOSIL BO’LADIGAN TEBRANISHLARNI BINOGA TA’SIRINI ANIQLASH VA KAMAYTIRISH CHORALARINI TAKOMILLASHTIRISH BO’YICHA TAHLILLAR. *Science and innovation*, *1*(A5), 372-375.

36. Abdunazarov, A. (2022). MAHALLIY HOM ASHYO TURI (QAMISH) DAN FOYDALANGAN HOLDA AVTOMOBILLAR HARAKATIDAN HOSIL BO’LADIGAN TEBRANISHLARNI BINOGA TA’SIRINI ANIQLASH VA KAMAYTIRISH CHORALARINI TAKOMILLASHTIRISH. *Science and innovation*, *1*(A5), 380-385.

37. Mirsaidov, M., Boytemirov, M., & Yuldashev, F. (2022). Estimation of the Vibration Waves Level at Different Distances. In *Proceedings of FORM 2021: Construction The Formation of Living Environment* (pp. 207-215). Springer International Publishing.

38. Yuldashev, S. S., & Boytemirov, M. (2020). Influence of the level of the location of the railway canvas on the propagation of waves from train motion. *ISJ Theoretical & Applied Science*, (05 (85)), 140.

39. Rashidov, T. R., Yuldashev, S. S., Karabaeva, M. U., & Boytemirov, M. B. (2019). Sostoyanie voprosa zaщitiy naseleniya, promiyshlenniyx i grajdanskix zdaniy ot transportniyx vibratsiy. *Problemiy mexaniki*, *1*, 8-11.

40. Yuldashev, S. S., Karabaeva, M. U., & Boytemirov, M. B. (2018). Issledovanie koeffitsientov usloviy izlucheniy na granitsax zavisimosti ot chastotiy rasprostranyaemoy uprugoy volniy pri

reshenii dinamicheskoy teorii uprugosti metodom konechniyx elementov. *Problemiy mexaniki*, *2*, 68-71.

41. Yuldashev, S. S., Boytemirov, M. B., & Akbarov, A. I. (2018). Vliyanie viysotiy raspolojenie jeleznodorojnogo polotna na uroven kolebaniya grunta, voznikayuщego pri dvijenii poezdov. *Mejdunarodniyy nauchniyy jurnal. Viypusnik*, (10), 55.
42. Yuldashev, S. S., & Boytemirov, M. (2020). Влияние уровня расположения железнодорожного полотна на уровень распространения волн от движения поездов. *Theoretical & Applied Science*, (5), 140-143.
43. Yuldashev, S. S., Karabaeva, M. U., & Boytemirov, M. B. (2018). Issledovanie koeffitsientov usloviy izlucheniy na granitsax zavisimosti ot chastotiy rasprostranyaemoy uprugoy volniy pri reshenii dinamicheskoy teorii uprugosti metodom konechniyx elementov. *Problemiy mexaniki*, *2*, 68-71.
44. Yuldashev, S. S., Boytemirov, M. B., & Akbarov, A. I. (2018). Vliyanie viysotiy raspolojenie jeleznodorojnogo polotna na uroven kolebaniya grunta, voznikayuщego pri dvijenii poezdov. *Mejdunarodniyy nauchniyy jurnal. Viypusnik*, (10), 55.
45. Yuldashev, S. S., & Boytemirov, M. (2020). Влияние уровня расположения железнодорожного полотна на уровень распространения волн от движения поездов. *Theoretical & Applied Science*, (5), 140-143.
46. Saifitdinovich, Y. S. (2022). The Effect Of Vibrations On Buildings Caused By Car Traffic. *Journal of Pharmaceutical Negative Results*, 1309-1316.
47. Юлдашев, Ш. С., & Бойтемиров, М. Б. Ў. (2023). Темир йўл поездлари ҳаракатидан ҳосил бўлган тўлқинларнинг биноларга таъсирини камайтириш. *Строительство и образование*, *1*(3), 5-10.
48. Saifitdinovich, Y. S., Ugli, B. M. B., Ugli, Y. F. S., & Ugli, K. S. R. (2022). Propagation of Vibrations Created by the Movement of Trains on Parallel Railway Tracks, in the Ground and in Buildings. *International Journal of Early Childhood Special Education*, *14*(5).
49. Saifitdinovich, Y. S., & Ugli, B. M. B. (2021). Protection of Vibrations Caused by Railway Traffic by Introducing Changes in the Foundation Structures of the Buildings. *Design Engineering*, 5497-5503.
50. Rasuljon o'gli, K. S. (2023). The Importance of Didactics in Pedagogy and Stages of The Didactic Process. *Journal of Innovation in Education and Social Research*, *1*(4), 1-6.
51. Rasuljon o'g'li, K. S., & Muhammadjanovna, K. F. (2023). ADVANTAGES AND DISADVANTAGES OF USING STEEL REINFORCEMENTS AND COMPOSITE REINFORCEMENTS IN BUILDING STRUCTURES. *AMALIY VA FUNDAMENTAL TADQIQOTLAR JURNALI| JOURNAL OF APPLIED AND FUNDAMENTAL RESEARCH*, *2*(6), 1-5.
52. Khakimov, S. R. (2023). The Influence of Temperature on the Surrounding Environment and Process Hardening of Concrete. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(6), 314-321.
53. Mamajanov, M., & Negmatov, M. K. A Simplified Method for Determining the Water Supply of Centrifugal and Axial Pumping Units of Municipal Water Supply Systems. *International Journal of Innovations in Engineering Research and Technology*, (1), 1-7.
54. Мамажанов, М., & Иброхимжонов, Х. Ш. (2021). Новый упрощенный метод определения водоподачи центробежных насосных агрегатов. *Экономика и социум*, (3-2 (82)), 110-115.
55. Ibrahimjonov, H. S. (2022). Analysis of the negative impact of cavitation, dirt and spills on pumping devices. *European International Journal of Multidisciplinary Research and Management Studies*, *2*(12), 310-316.

56. Иброхимжонов, Х. Ш., & Қаюмов, Д. А. (2023). Сув Ва Муаллақ Чўкиндилар Аралашмаси Ҳаракатида Қувур Ўтказгичнинг Ишқаланишига Таъсир. *IQRO*, *2*(1), 670-674.

57. Jo'Raev, S., & Ibroximjonov, X. (2022). Насос деталларининг ейилиш механизми ва унинг назарий асослари. *Science and innovation*, *1*(A8), 604-609.

58. Центробежных, Н. У. М. О. (2021). Насосных Агрегатов М Мамажанов. *ХШ Иброхимжонов-Экономика и социум*.

59. Худайбердиев, Н., & Иброхимжонов, Х. (2023). СЕЙСМИК КУЧЛАРНИНГ СУВ ОМБОРИ ТУПРОҒИ СТРУКТУРАСИГА ТАЪСИРИНИНГ ФИЗИК ХОССАЛАРИ. *IQRO*, *2*(2), 669-674.

60. Иброхимжонов, Х. Ш., & Туражонова, Р. Т. (2023). Насослардаги кавитация ва лойқа, қум, осилма оқизиқларнинг насос қурилмаларига салбий таъсири. *IQRO*, *2*(1), 573-578.

61. Joraev, S., & Ibroximjonov, X. (2022). BENDING MECHANISM OF PUMP PARTS AND ITS THEORETICAL BASICS. *Science and Innovation*, *1*(8), 604-609.