

РЕЗЮМЕТА НА НАУЧНИТЕ ТРУДОВЕ

НА ГЛ. АС. Д-Р ИНЖ. ДИМИТЪР СТОЯНОВ ГЕОРГИЕВ

Представени за участие в конкурс за заемане на академична длъжност „Доцент“

обявен в Държавен вестник бр. 30/15.04.2022 г.

Област на висше образование: 5. Технически науки

Професионално направление: 5.13. Общо инженерство

Г.7	Статии и доклади, публикувани в научни издания, реферирани индексирани в световноизвестни бази данни с научна информация (За самостоятелна статия и доклад се зачитат 40 точки. За статия и доклад в съавторство се зачитат 40/n точки или разпределени в съотношение на базата на протокол за приноса, като n е броя на съавторите.)
------------	--

Статия № Г.7.1

Bulgarian Journal of Agricultural Science, 26 (Suppl. 1) 2020, 202-207

Comparative analysis of the efforts in the reinforced concrete of the milking platform in the parallel and tandem milking parlor

Dimitar Georgiev

Trakia University, Faculty of Agriculture, Department of Agricultural Engineering, 6000 Stara Zagora, Bulgaria
* Corresponding author: ds_georgiev@abv.bg

Abstract

Georgiev, D. (2020) Comparative analysis of the efforts in the reinforced concrete of the milking platform in the parallel and tandem milking parlor. *Bulg. J. Agric. Sci., 26 (Suppl. 1), 202-207*

The aim of this study was to investigate efforts in reinforced concrete of platforms in milking parlor "Parallel" and "Tandem". To achieve the objective models have been developed for describing the coordinates of their limbs, to the outline of the milking platform. By specialized software are introduced static models (load combinations) for loading reinforced concrete of the milking platform. Calculated bending moments are introduced to computational load impacts. Studies prove that the location and size of the load directly affect the operational status of the construction of milking platforms. Found that for the same number of animals (equal load) at milking parlor "Parallel" the value of the lower bending moments ($M_{hD} = M_{11}$) is three times smaller (0.15 kN.m) than in "Tandem" (0.45 kN.m). In a third combination in operation load is reduced by 50% and the lower bending moments and M_{xD} , M_{yD} reduce nearly 5 times. The largest absolute value of bending moments amounts to 1.37 kN.m., from which it follows that adopted reinforcement 5 pieces N8 / m completely "cover (enough)" requirements and can accommodate bending moments to 5.23 kN.m. or nearly three times more than estimated.

Keywords: milking parlor; milking platform; reinforced concrete; load model

Bulgarian Journal of Agricultural Science, 25 (Suppl. 3) 2019
Agricultural Academy

Structure-time analysis and development of dairy cows machine milking models in “Herringbone” milking parlors

Kancho Peychev, Dimitar Georgiev*, Galina Dineva, Vanya Dimova

*Trakia University, Faculty of Agriculture, Department of Agricultural Engineering,
6000 Stara Zagora, Bulgaria*

**Corresponding author: ds_georgiev@abv.bg*

Abstract

Peychev, K., Georgiev, D., Dineva, G. & Dimova, V. (2019). Structure-time analysis and development of dairy cows machine milking models in “Herringbone” milking parlors. *Bulg. J. Agric. Sci.*, 25 (Suppl. 3), 196–200

A real-time video monitoring of the milking process in three “Herringbone” milking parlors with capacities ranging from 2x6 to 2x10 was carried out. On the basis of the archived data the duration of all milking udder preparation operations (washing, drying and attaching of milking units) is timed. Based on the accumulated experimental information from the three monitored objects four recommended models were developed for the sequence of work in preparing animals for milking in „Herringbone“ milking parlors. Models I and II have been found to be suitable for use in „Herringbone“ milking parlors with a capacity of up to 2x6. Model III is applicable for parlors with a capacity up to 2x8 and model IV can be used in parlors with a capacity up to 2x10.

Keywords: milking parlors; machine milking; technological operations

Production Systems

Study on energy flows of renewable sources for producing hot water on dairy farms

R. Georgiev¹, K. Peychev¹, D. Georgiev¹, R. Slavov^{2*}, S. Apostolov³, J. Ellingsen⁴, J. Tønnesen⁴

¹Department of Agricultural Engineering, Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

²Department of Animal Science – Ruminants and Dairy Farming, Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

³Bioselena Foundation for Organic Agriculture, Bulgaria

⁴Royal Norwegian Society for Development, Norges Vel, Norway

(Manuscript received 10 May 2016; accepted for publication 2 August 2016)

Abstract. A system for producing hot water in three dairy farms has been designed and built. It consists of three modules of renewable energy sources - solar thermal installation, heating boiler on wood pellets and recuperative unit for utilizing heat from the milked milk. For storage of the heated water two thermal batteries are used. One of the thermal batteries is a low temperature one (40°C) and is designed to utilize energy from milk, the other one is high-temperature (80°C) and is designed to accumulate solar energy and energy from the pellet boiler. The year-round operation of the system on three different farms has been examined. For every month results were obtained about the relative share of each of the renewable energies. Each system produces annually respectively 11273 kWh, 13668 kWh and 10244 kWh of energy to heat water. The share of solar energy is between 34.7 – 43.0% in annual terms, in summer it reaches 85-95%. The share of energy from pellets per year is 52 – 57%, in winter it reaches 65 – 96%, while the share of utilized energy from milked milk averaged 9.5% annually.

Keywords: renewable energy sources, hot water, dairy farms

Agriculture and Environment

Saved CO₂ emissions by using renewable sources for hot water yield in Bulgarian dairy farms

R. Georgiev^{1*}, R. Slavov², K. Peychev¹, D. Georgiev¹, S. Apostolov³, J. Ellingsen⁴, J. Tønnesen⁴

¹Department of Agricultural Engineering, Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

²Department of Animal Science – Ruminant Animals and Dairy Science, Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

³Bioselena Foundation for Organic Agriculture, Bulgaria

⁴Royal Norwegian Society for Development, Norges Vel, Norway

(Manuscript received 13 September 2017; accepted for publication 10 November 2017)

Abstract. In 2014 – 2015 installations for hot water yield from renewable energy sources were built and tested in three dairy farms in Bulgaria. These replace the traditionally used electricity on farms with the aim of decarbonising the energy production. The newly built installations contain three modules for heat yield – from recuperation of the heat from the milked milk, from the solar energy and from wood pellets. In the course of one year the energy obtained from the renewable sources has been measured and assessed. The present article assesses the ecological benefits of the separate renewable sources which are used to reduce CO₂ emissions, the main greenhouse gas. For this purpose, the method of environmental life cycle analysis (LCA) and assessment of heat/hot water generating systems was used. Coefficients for calculating the primary energy of the saved or replaced energy, as well as their respective carbon ratios, specific for Bulgaria, were used. The results obtained are related to identifying the specific quantities of saved CO₂ emissions from the renewable sources used on the experimental farms. It has been found that about 52-57% of CO₂ savings are due to the pellets used, 34-42% to the solar heat collectors and about 9% to the recuperated heat from the produced milk.

Keywords: dairy farms, wood pellets, solar thermal systems, milk recuperation, CO₂ emissions, life cycle assessment

Theoretical analysis of the heat energy savings in wood pellets production

R. Georgiev*, K. Peychev, V. Dimova, D. Georgiev

Department of Agricultural Engineering, Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

(Manuscript received 4 June 2018; accepted for publication 6 August 2018)

Abstract. The report includes a theoretical analysis of the heat energy savings in the drying of wood biomass with desiccant fumes. With the current technological schemes for drying wood pellets most heat is lost with the exhaust fumes. To use the heat of exhaust fumes it is propose to utilize these by a heat exchanger recuperator type, which transfers part of the heat of the exhaust gas to the fresh air entering the dryer installation. Thus, about 25% of the heat for drying biomass can be saved. The report examines the relationship between outdoor temperature and condensation of moisture from the exhaust gases on the relative share of energy saved using a heat exchanger.

Keywords: wood biomass, heat savings, desiccant fumes, exhaust fumes, heat exchanger recuperator

Express assessment of some building parameters in milking parlors for cows

Dimitar Georgiev*, Vanya Dimova, Kancho Peychev and Galina Dineva

Trakia University, Faculty of Agriculture, Department of Agricultural Engineering, 6000 Stara Zagora, Bulgaria

*Corresponding author: ds_georgiev@abv.bg

Abstract

Georgiev, D., Dimova, V., Peychev, K. & Dineva, G. (2020) Express assessment of some building parameters in milking parlors for cows. *Bulg. J. Agric. Sci., 26 (Suppl. 1), 208-211*

The analysis of the construction and planning parameters of milking parlor with different capacity and configuring the animals on the milking platforms was carried out. The studies are complemented by an assessment of the construction parameters in different variants of the input - output traffic of the animals to the milking parlor. The subject of the analysis is to determine the quantity for the different variants of the situation. On this basis, regression equations for express estimation of the change of the basic building materials (concrete and reinforcing steel) with changing the capacity of the milking parlor are derived. The equations are universal and could be used extensively to initially estimate the intrinsic the basic building materials (concrete and reinforcing steel) in the construction of the floor profile.

Keywords: express estimation; milking parlor; planning parameters; regression equations

Design of an energy efficient building equipped with air conditioning system for growing "Kladnitsa" mushrooms

Vanya Dimova*, Dimitar Georgiev, Rashko Georgiev and Stoyan Grigorov

Trakia University, Faculty of Agriculture, Department of Agricultural Engineering, 6000 Stara Zagora, Bulgaria

*e-mail: vpdimova@abv.bg

Abstract

Dimova, V., Georgiev, D., Georgiev, R. & Grigorov, S. (2020) Design of an energy efficient building equipped with air conditioning system for growing "Kladnitsa" mushrooms. *Bulg. J. Agric. Sci., 26 (Suppl. 1), 221-228*

The purpose of the study is to create appropriate technological parameters in a building for intensive year-round cultivation of "Kladnitsa" mushroom by air-conditioning the room. To achieve this goal, an original energy efficient building was developed, consisting of a lightweight type of glasshouse with a reinforced concrete floor and a steel supporting structure. The mushrooms are grown in polyethylene bags on 4 pieces of three-storey metal racks all year-round. Based on the research, a HVAC (heating-ventilation-air-conditioning) system for year-round maintenance of the microclimate in the mushroom facility was proposed and developed. The obtained results show that the selected building materials are suitable for a year-round intensive cultivation of "Kladnitsa" mushroom. It allows successful air conditioning in the year-round. Its cooling in the summer is possible and economically feasible to be done with groundwater with $t_{gw}=10-12^{\circ}\text{C}$. Known deviations of 3°C from the optimum internal temperature are observed on hotter days. Higher heat and cooling loads during the cultivation are in the fruiting phase, so it is recommended that the sizing of the equipment be carried out at this phase. Evaporative cooling of the room by spraying water is successful, because it simultaneously lowers the temperature and increases the humidity. Third heat exchanger is also recommended (in the part of the general circulating air), which in the case of insufficient heat influxes from the outside, to raise the temperature of the treated air sufficiently to reach the recommended microclimatic parameters in the room.

Keywords: glasshouse; heating-ventilation-air-conditioning; microclimate; technological parameters

Regression analysis to evaluate the effect of pulsation rate on the morphological structures of cow teats

Galina Dineva*, Kancho Peychev and Dimitar Georgiev

Trakia University, Faculty of Agriculture, Department of Agricultural Engineering, 6000 Stara Zagora, Bulgaria

*Corresponding author: galinats@abv.bg

Abstract

Dineva, G., Peychev, K. & Georgiev, D. (2020) Regression analysis to evaluate the effect of pulsation rate on the morphological structures of cow teats. *Bulg. J. Agric. Sci.*, 26 (Suppl. 1), 212-215

In a previous study (Dineva et. al., 2019) an ultrasound examination of the following morphological structures of the cow teats was performed: the length and diameter of the teat canal, the teat wall thickness, the teat diameter in the region of Furstenberg's rosette, the diameter of teat cistern in its middle part and the cistern diameter at the teat base. The scan was performed before milking, immediately after milking, at the 1st and 2nd hours after milking. During milking two types of milking units (with a cylindrical shape of the pulsation chamber and the so-called tri-circle) were used in combination with different frequency modes. The present study is a continuation of the above by performing statistical processing of the obtained data to determine the coefficients of variation, correlation and correlation ratio, the regression equations are derived to determine the influence of pulsation rate on the observed morphological structures of cow teats. The obtained regression models allow extrapolation and estimation of the change in the structures of the milk papilla outside the experimental gradations of the pulsation rate.

Keywords: cow; correlations; pulsation rate; regression equations; teat health



AGRICULTURAL SCIENCE AND TECHNOLOGY, VOL. 13, No 3, pp 288-291, 2021

Published by Faculty of Agriculture, Trakia University, Bulgaria

ISSN 1313-8820 (print)

ISSN 1314-412X (online)

<http://www.agricitech.eu>

DOI: 10.15547/ast.2021.03.047

Pulsation parameters of new and used milking liners with round cross section

G. Dineva*, K. Peychev, D. Georgiev

Department of Agricultural Engineering, Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

(Manuscript received 4 June 2021; accepted for publication 26 July 2021)

Abstract. *Milking machines equipped with new and used milking liners with a round cross section were studied. The used milking membranes were operated for 3 months on a farm for rearing 60 cows (Holstein cattle) with double milking per day. The experiment involved recording the standard pulsation phases "a", "b", "c" and "d" (in absolute units) in the frequency range from 1 Hz to 2.5 Hz, in a vacuum mode of 40 kPa and 50 kPa and at a pulsation ratio of 50/50%. It was found that the transients (phase "a" and phase "c") are faster and the established phases (phase "b" and phase "d") are longer in milking units equipped with used milking liners. The conclusions are related to the service life of the milking liners.*

Keywords: depreciation of liners, milking liner, pulsation phases



Optimizing the thickness of a straw outer wall of a building for sows in a view to achieving cost-effective heat insulation

V. Dimova*, D. Georgiev

Department of Agricultural Engineering, Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

(Manuscript received 22 November 2020; accepted for publication 16 April 2021)

Abstract. *The aim of the study is to determine the optimum thickness of the surrounding wall structure of a building for nursing sows by using heat insulation from straw and different fuel (pellets and dry wood) for heating the building. To achieve the purpose, 6 models of walls made of environmentally friendly panels with wooden skeleton, thermal insulation from pressed straw bales and double-sided clay plaster have been developed, such that the accepted thickness of the thermal insulation layer is respectively: 20, 25, 30, 35, 40 and 45 cm. The construction value of the finished wall is determined by adding the value of the construction and assembly works on the construction site to the value of the preparation of the panels (in a workshop), including the payment of labor, materials and additional costs for the implementation of clay plaster and waterproofing membrane. The annual energy losses through 1 m² of the enclosing wall and the annual heat insulation costs (as a sum of annual energy cost and the depreciation deductions) are determined through the described methodology and verification of condensation of water vapor on the inner surface of the wall was carried out. The results of the research show that by using pellets for fuel, the optimal thickness of the thermal insulation is 45 cm, and by using dry wood it is 35, 40 and 45 cm. All studied models of enclosing straw wall meet the hygienic requirements for preventing condensation on their inner surfaces.*

Keywords: annual costs, energy losses, dry wood, heat insulation, nursing sows, pellets

УПРАВЛЕНИЕ НА СТРОИТЕЛНИТЕ ОТПАДЪЦИ ПРИ РЕКОНСТРУКЦИЯ НА ГОВЕДОВЪДНА СГРАДА

Ваня Димова, Димитър Георгиев, Славина Петкова
Тракийски университет – Стара Загора

РЕЗЮМЕ

Целта на изследването бе да се направи прогноза за управлението на строителните отпадъци, получени при реконструкция и технологична модернизация на съществуваща сграда за млечни крави.

Разработен бе вариант за свободно отглеждане в индивидуални боксове на 94 крави, подходящ за модернизация на технологичните процеси в съществуваща сграда за вързано отглеждане на 73 крави. Определени бяха количествата на различните строителни отпадъци по време на реконструкцията и бе изготвен прогнозен лист за управлението им.

Установено бе, че се получават 61,2% (113,6 m³) „неопасни“ и 38,8% (72,0 m³) „опасни“ отпадъци, класифицирани като такива, съгласно наредбите. Някои „опасни“ отпадъци са подходящи за повторна употреба при условията на говедовъдна ферма (обект с отделяне на неприятни газове). Това са: бетон за армирана бетонна настилка – 29,5 t (оползотворяване 100%); бетон от ясли – 37,5 t (оползотворяване 100%); подови тухли – 10,0 t (оползотворяване 50%); профилна стомана – 2,4 t (оползотворяване 90%). Според направената прогноза за образуваните при реконструкцията на сградата строителни отпадъци, степента на материалното им оползотворяване е 66,5% – с 11,5% по-висока от нормативно изисквана за периода 2017–2018 г. (55%).

Ключови думи: обор за свободно отглеждане на млечни крави, обор за вързано отглеждане, реконструкция и технологична модернизация, строителни отпадъци, управление

Г.8	Статии и доклади, публикувани в нереферирани списания с научно рецензиране (За самостоятелна статия и доклад се зачитат 20 точки. За статия и доклад в съавторство се зачитат 20/n точки или разпределени в съотношение на базата на протокол за приноса, като n е броя на съавторите.)
------------	--

Статия № Г.8.1

RESEARCH ARTICLE

[\(Open Access\)](#)

Determination of the Economically Expedient Thickness of a Reed Roof of Building for Laying Hens

VANYA DIMOVA¹, DIMITAR GEORGIEV¹, KRASIMIRA UZUNOVA^{2*}, MARINA TOSHESKA³

¹Department "Agricultural Engineering", Faculty of Agriculture, Trakia University, 6000 Stara Zagora, Bulgaria

²Department "Total livestock" Veterinary Medicine Faculty, Trakia University, 6000 Stara Zagora, Bulgaria

³Association for rural development Local Action Group AGRO LIDER, 7500 Prilep, North Macedonia

Abstract

The purpose of the study is to determine the economically expedient roof thickness of a building for laying hens in use heat insulation from reeds and different fuel for heating (pellets and coal "Donbaski"). To achieve the purpose, 6 variants of a roof of 10, 15, 20, 25, 30 and 35 cm thick reeds plates are developed. The price of one reeds plate is calculated by including only the construction works for its preparation. The construction value of the ready roof (with VAT and transport) is obtained by adding to the value of the construction works for the preparation the value of the construction and assembly works of the site, the payment of the labor, the execution of the plank sheathing, the waterproofing and the laths. The annual energy losses through a 1 m² of the roof structure are determined through the submitted methodology. The annual heat insulation costs are calculated as a sum of annual energy cost and the depreciation allowances. Verification of condensation of water vapor on the inner surface of the reed roof was carried out. These results show that by using fuel pellets, most appropriate thickness of the thermal insulation is 25 cm, and by using Donbas coal - 30 cm. All investigated variants of the reed roof meet hygienic requirements to prevent condensation of water vapor on its inner surface.

Keywords: Reeds roofs of buildings, laying hens, pellets, coals, energy losses, annual costs

Приблизителен метод за определяне центъра на тежестта на четириноги селскостопански животни

Димитър Георгиев*

Тракийски университет, Стара Загора, България
Аграрен факултет, катедра „Аграрно инженерство“
гр. Стара Загора 6000, Студентски град,
E-mail: ds_georgiev@abv.bg

*Corresponding author

Резюме: Целта на изследването е да се представи приблизителен метод за определяне центъра на тежестта на четириноги селскостопански животни. Чрез вече известни похвати от теоретичната механика са направени пресмятания, като тялото на животното е разделено на типизирани фигури. Въведени са координатни системи XU и YZ и са пресметнати координатите на центровете на тежестта на отделните типизирани фигури, и е изчислен центъра на тежестта на цялата фигура. Същият е представен като вертикална сила с посока от центъра на тежестта на животното, перпендикулярно към повърхността на пода и е изразен като точка от разрезна линия, отстояща на разстояние 90,5 cm от задните крайници. Изчислителният модел показва, че предните два крайника упражняват натоварване, еквивалентно на 391 kg, а, задните крайници на 409 kg.

Ключови думи: селскостопански животни, център на тежестта, приблизителен метод за изчисление натоварването върху крайниците.

Сравнителен анализ на необходимите количества строителни материали за изпълнение на оградащата конструкция на доилни зали с различна технологична конфигурация

Димитър Георгиев*,

*катедра „Аграрно инженерство“, Аграрен факултет
Тракийски университет, Стара Загора, България
гр. Стара Загора 6000, Студентски град,
E-mail: ds_georgiev@abv.bg*

**Corresponding author*

Резюме: В настоящата разработка е извършен сравнителен анализ на необходимото количество строителни материали за направата на оградащата конструкция на доилните зали с различен капацитет и начин на конфигуриране на животните върху доилните платформи.

Извършен е регресионен анализ на строително-планировъчните разходи в зависимост от конкретно разработения модел. Изводите от резултатите са насочени към минимизиране на количествените разходи за изграждане на оградащата конструкция на доилни зали при предварително зададени технологични условия.

Доказано е, че капацитетът на залата за доене влияе пропорционално на абсолютните количества и обратнопропорционално на отнесените материали към едно доилно място. Местоположението на входа на доилните платформи също оказва влияние върху изискуемите разходи на строителните материали.

Ключови думи: доилни зали, параметри за планиране, разходи за строителство и планиране, технологични условия

INVESTIGATION OF THE FUNCTIONAL DEPENDENCIES BETWEEN MILKING UNIT PULSATION PARAMETERS AND PRESSURE ON AN ARTIFICIAL TEAT

Galina Dineva, Kancho Peychev, Veselin Vlashev,
Dimitar Georgiev, Vanya Georgieva
Department of Agricultural Engineering, Faculty of Agriculture
Trakia University of Stara Zagora, Bulgaria
Studentski grad, 6000 Stara Zagora, Bulgaria
e-mail: galinats@abv.bg, kvp_sz@abv.bg, vesvlashev@abv.bg, dsgeorgiev@abv.bg

Abstract: *The milking units with a triangular shape in cross-section were investigated. The data obtained are related to the structure (time-frequency components) of pulsogramme describing the mode of operation of the respective samples. The pressure is measured performed by milking liner on artificial teat at different parameters of pulsation system. The relationship between pulsation parameters of the milking units and the pressure exerted by them on an artificial teat were studied.*

Keywords: *milking unit, artificial teat, pressure.*

Дата: 17.05.2022 г.

Подпис:.....

(гл. ас. д-р инж. Д. Георгиев)