

Heitkämper, Katja; Schick, Matthias and Fritzsche, Stephan

Working-time requirement in pig fattening

The organisation of work on modern pig-production farms is characterised by daily recurring routine tasks, as well as by periodically occurring work peaks. In addition to this, there are management and special tasks to be performed. Accurate work-economics data are therefore of the greatest importance for the meticulous planning of all activities. The joint ART / KTBL project "Working-Time Requirement in Conventional Pig Production" models 13 modern piglet-rearing, pig-breeding and pig-fattening methods. This paper describes the methodical approach taken to these issues. Selected results are introduced, using fattening-pig production as an example.

Keywords

Working-time requirement, model calculation, pig production

Abstract

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■ The general conditions governing construction for the seven relevant methods of pig fattening, the three methods of pig breeding and the three of piglet rearing are set by housing models from the KTBL BAUKOST program [1]. Herd and group sizes are also obtained from the housing models. The first step is to determine all the working procedures and working sub-processes associated with a particular production method. A distinction is made here between daily routine tasks and non-daily tasks. The latter include all farm management tasks and special jobs. Workflow models are then defined for each procedural variant. The workflow models contain all the essential workflow segments relating to working method time requirements. All key production data such as fattening start and finish weights, daily increases, animal losses, etc. are taken from the 2010/2011 KTBL data collection [2]. The key production data and other quantitative and qualitative influencing variables, e.g. proportion of sick animals, type of feed, frequency of dung removal, are compiled as a list of variables and auxiliary variables. An independent dynamic simulation model is created for each housing variant with a model calculation system.

Base data

The modelling of production and working procedures is conditional on the availability of a sufficient number of validated work elements. The base data for modelling the 13 production procedures create a standard time database with around 1500

work elements from indoor and outdoor agricultural work including special jobs and management activities. All the working time data included are collected by the REFA work element method in the form of direct measurements during task observations on commercial farms [3]. These are element time measurements, i.e. in each case elapsed time segments (measured in $c_{\min} = 1/100$ min) are assigned to the associated work elements. The time is recorded by tablet, hand-held or pocket PC and specialist time recording software (WinTimer, OrtimB3), which even during collection permits an initial evaluation of the working time study in terms of data quality.

Following the time measurements the measured values for the work elements are statistically analysed. Each element is saved to a standard time database with a unique alphanumeric code, the standard time and a description of the content [4]. The relevant work elements from the standard time database are transferred to the flow models as workflow segments.

Model calculation system

The PROOF model calculation system is used for modelling the working time requirement [4; 5]. PROOF is a modular system based on table calculation software. The standard time database and the list of variables and auxiliary variables are the two key modules in this system. The results output constitutes a further module. To calculate the working time requirement, the workflow segments from the standard time database are linked to the influencing variables from the list of variables and auxiliary variables. Quantitative influencing variables, e.g. the number of fattening pigs [n] or the distance [m], are multiplied by the standard time values of the corresponding work elements. Qualitative influencing variables, for example the deworming procedure (treatment of individual animals or by

feed allocation) can be integrated in the form of logical retrieval routines (“when”, “then”, “else”, etc.).

Model farm influencing variables

In the example below the working time requirement is calculated for an enclosed fattening pig house with large groups of 40 animals each per pen. Three herd sizes (960, 1600 and 1920 places) are considered. The compartments are managed using the batch rearing system. 2.8 fattening cycles per year are reckoned (123 days fattening, 7 days sanitary break). Feed distribution is by fully automatic chain conveyor. Feeding is ad lib. from automatic wet mix feeders. The fully slatted pen floor has holding pond channels which are emptied twice per cycle under the exchange storage system. All animals leaving the pen are weighed with a fixed individual animal scale. The transportation of post-weaning piglets and animals for slaughter is carried out by a haulage company. After the pens are cleared the compartments are cleaned and disinfected with a soaking system.

In calculating the working time requirement for the model farm a distinction is made between daily routine tasks, special tasks and farm management tasks. Feeding and dung removal are usually counted as routine tasks. In highly mechanised husbandry methods, however, these activities are reduced to system function checks and control procedures. Monitoring tasks come under farm management. To improve comparability with other husbandry methods, animal and water checks, together with feeding system and ventilation system inspections in the present example, are counted as daily routine tasks. Special tasks are taken to be non-routine activities, either scheduled or unscheduled [6]. These include moving animals into, out of and between housing, individual animal measures (medical treat-

ment, deworming, removing dead animals), cleaning and disinfection, dung removal, maintenance and repair work. Farm management tasks only take account of activities directly associated with fattening pig production. These include planning and organisation, monitoring tasks (veterinary herd inspection, feed stock control, checking the work of apprentices, trainees, third-party farm inspection), record keeping, purchasing and sales, monetary transactions and finances, accounting, information and further education as well as consultancy.

Model farm working time requirement

Table 1 shows the key work study figures for routine tasks in a standard commercial fattening farm with 960 places. Animal monitoring, carried out from the passageway, clearly accounts for the greatest proportion of daily routine work at 58%. From a work study perspective ad libitum feeding has the drawback of there being no communal livestock feeding times. Animal monitoring during feeding time can significantly reduce the working time requirement. Group size has the reverse effect. In large (more than 20 animals) and mega-groups (special sizes of over 100 animals) more frequent checks have to be carried out in the pen, increasing the working time requirement.

The total working time requirement for the three model pig fattening farms is between 1.48 and 1.61 MH per fattening place per year (**cf. figure 2**). As in most production methods, herd size has a significant influence on working time requirement. When herd size increases from 960 to 1600 fattening places, under otherwise identical circumstances the total working time requirement falls by 6.2%, and by 2.0% when the number of fattening places increases from 1600 to 1920. The working time requirement for daily routine tasks drops by 4.1% from 960 to 1600 fattening places, remains unchanged from 1600 to 1920 places. The working time requirement for special jobs falls by around 4% in each case. On the other hand, a significant degression effect is produced in farm management, where the share of total working time requirement decreases by 9.7 and 3.6 % respectively.

Conclusions

The working time requirement in conventional pig fattening is greatly dependent on the degree of mechanisation. In highly mechanised husbandry systems, as in the present example, the relative proportion of farm management tasks is over 30%. Farm management tasks and special jobs can be carried out with varying intensity, so the working time requirement for these activities is subject to great fluctuation. All the same, the proportion of total working time requirement taken up by farm management jobs shows a rising trend. In future the farm managers on modern pig farms will spend an increasing amount of time in the office and less and less time in the pens.

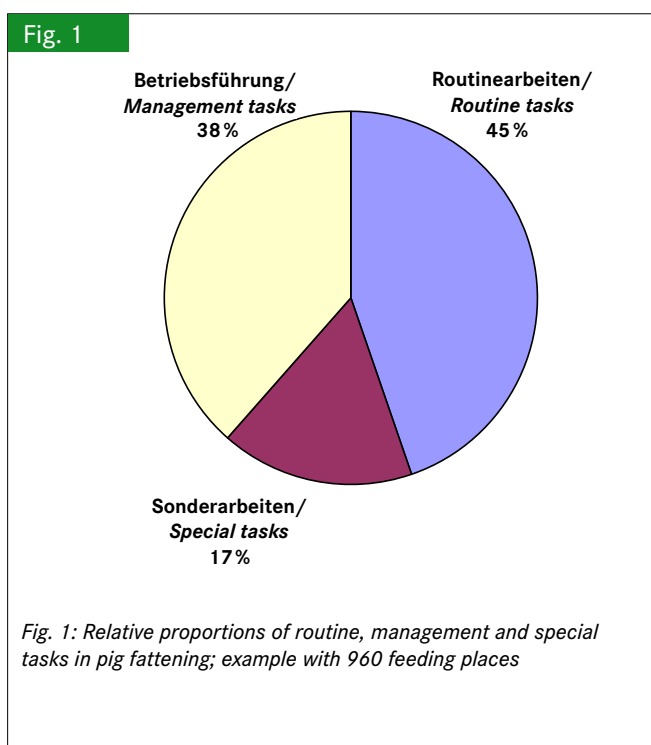


Table 1

Table 1: Work-economics key figures for routine tasks in pig fattening; example with 960 feeding places

Arbeitsgang/ Operation	Arbeitszeitbedarf pro 10 Tiere je Tag [AKmin]/ Working-time require- ment per 10 animals and day [MPmin]
Rüstarbeiten/Preparation time	
2 x tägl. vor- und nach dem Kontrollgang 2 times daily before and after the inspection round	0.1
Tierkontrolle/Livestock check	
2 x tägl. vom Stallgang aus 2 times daily from the passageway	0.7
Tränkekontrolle/Water check	
2-3 x wöchentl. in der Bucht 2-3 times weekly in the bay	0.1
Kontrolle der Stalltechnik (Fütterung, Lüftung)/ Pen technology check (feeding, ventilation)	
1 x tägl. Lüftung: Steuerungskasten am Abteil Once per day, ventilation: control box at compart- ment	0.1
1 x tägl. Fütterungsanlage: Stall-PC Once per day, feeding system: pen PC	0.2
Gesamtsumme pro 10 Tiere je Tag [AKmin]/ Total per 10 animals and day [MPmin]	1.2
Gesamtsumme pro Mastplatz und Jahr [AKh]/ Total per feeding place and year [MPh]	0.7
Gesamtsumme pro Bestand und Jahr [AKh]/ Total per herd and year [MPh]	636.7

Fig. 2

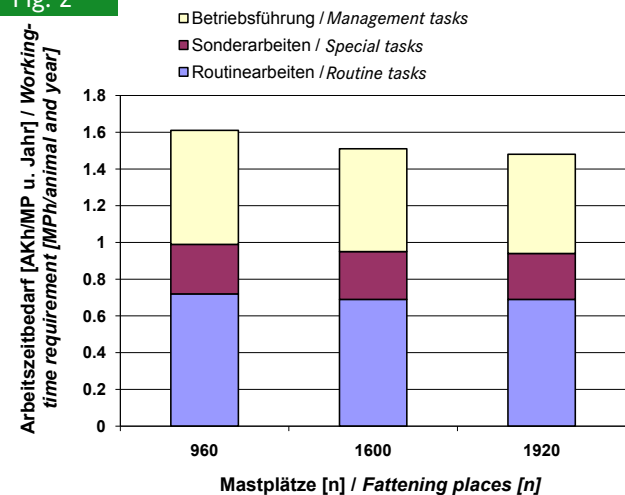


Fig. 2: Comparison of the working time requirement for routine, management and special tasks in pig fattening, 960, 1 600 and 1 920 feeding places

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Authors

Dipl.-Ing. Katja Heitkämper is a Research Associate at Agroscope Reckenholz-Tänikon ART, Tänikon, CH-8356 Ettenhausen, e-mail: katja.heitkaemper@art.admin.ch

PD Dr. habil. Matthias Schick is Director of the Building, Livestock and Labour Research Group at Agroscope Reckenholz-Tänikon ART, Tänikon, CH-8356 Ettenhausen, e-mail: matthias.schick@art.admin.ch

Dipl.-Ing. Stephan Fritzsche is a Research Associate at the Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. (KTBL), 64289 Darmstadt, e-mail: s.fritzsche@ktbl.de