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Improved Husbandry Quality with Less Work

Process Engineering Solutions for Horse Husbandry

Horse keeping is always labour intensive. Not only removing manure and distributing litter in the horse stables, but also the daily exercising, feeding and caretaking means a great deal of work. In the meantime, various technical advances have emerged from construction and process engineering, which can simplify much of the work involving horses. The extent to which such methods conform to animal needs and their impact on horse health and performance is being studied at the Experimental Station of the Institute for Production Engineering and Building Research of the FAL Braunschweig. The focus of the research is to document movement activity and evaluate automatic feeding systems.

Earlier studies on the working time requirement in recreational horse husbandry on farms [1] have shown that the total working time required for a single box stall can be up to 145 man-hours per horse and year. Littering and manure removal occupy about two thirds of the total working time requirement in the box husbandry, and about one third to one half of the time in the group husbandry (*Fig. 1*). Another large portion of time is dedicated (from 15 to 22 %) to routine tasks such as the preparation and feeding of roughage and concentrates, followed by the time needed to bring the horse to pasture or back to the stable (13 to 16 % of the time for routine tasks). One result of this study is that the various tasks in group husbandry can be better mechanized so that the working time requirement can be reduced by up to one third, independent from the size of the herd. Large group husbandry makes a further reduction of five man-hours/horse and year possible.

In a market analysis on the topic of sport horses [2], many athletes mentioned the relatively high level of time required for riding as a problem. An earlier study on the supply and demand in horse husbandry [3] came to the conclusion that the interest in horses is exceptionally large, but that for many potential horse owners the time obligations to ensure regular exercise for the horse is a significant deterrent to buying one.

Exercise Opportunities for Horses

The keeping of horses in group husbandry open stable systems offers horses a certain incentive to exercise and is also one of the most appropriate forms of horse husbandry, preceded only by pasture keeping. Own studies at the Institute for Production Engineering and Building Research have, however, shown, that keeping in a multi room group husbandry open yard system without additional exercise opportunities does not cover the exercise needs of the horse according to current requirements. Horses need more incentives for exercise as simply a large paddock, since they tend to be lazy. Additional movement is needed for the animals in order to prevent disease, particular locomotive diseases. Horses must not exercise on a daily basis if a large paddock (recommended are 30 to 40 m^2 per horse) is available to the horse at all times.

A reduction of stress for the rider is the exercising of horses on horse walkers and tread mills. At the Institute for Production Engineering and Building Research of the FAL studies were carried out on how the additional exercise opportunities impact the stress and exercise behaviour of the horses [4]. The horses were moved in an open tread mill for one hour every day in one part of the study.

Daily training had a positive effect on the condition, muscles and emotional status of the horses. Overall the results of this study have shown that additional exercise opportunities in the form of tread mills, pasture and non-green yards lead to a significant increase in the daily exercise activity, in contrast to paddock husbandry without additional exercise offerings (*Fig. 2*).

Another movement alternatives are horse walkers which provide a regular exercising of the horse through straight movement. The

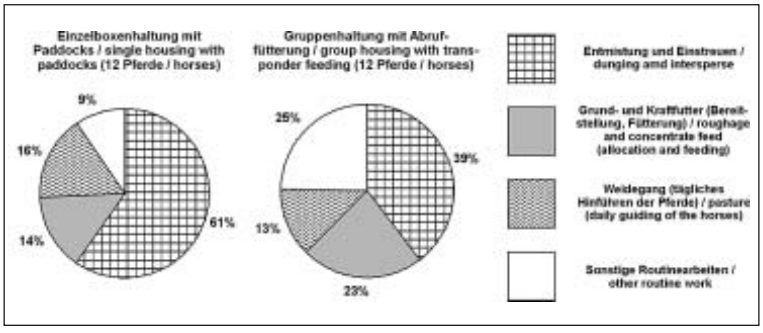

Fig. 1: Working time requirement of routine work (acc. to [1])

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Keywords

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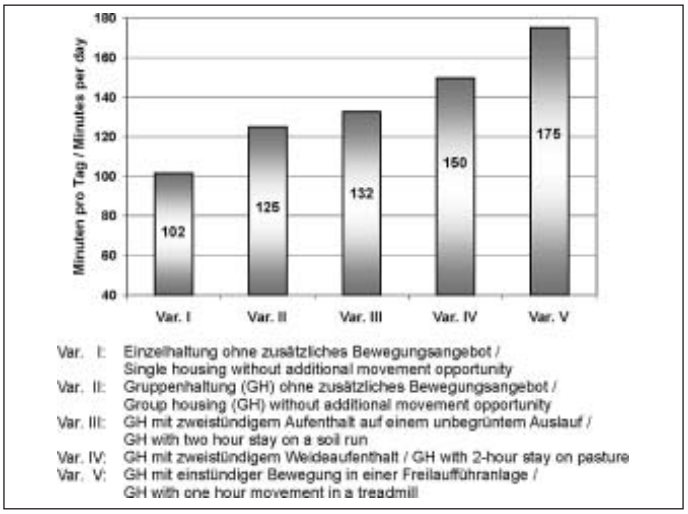

Fig. 2: Average movement activity of the horses in the different variants of movement offers [4]

disadvantage here is that only one horse can be exercised at one time, causing a great deal of working time input.

Feeding: Requirements and Input

The use of automatic feeding systems is also studied at the research station of the institute.

The popular practical methods are providing horses with large portions of roughage twice a day and offering them concentrates twice or three times daily manually. The reason for this is mostly the working time requirements and the linkage to certain feeding times. Studies at the FAL Braunschweig have shown, however, that through the manual offering of concentrates, waiting times occur which lead to disquiet and a higher stress level in the horses [5]. This knowledge was gained by measuring the heart frequency variability as well as through video evaluations of behavioural expression before and after feeding (*Fig. 3*).

In practice this means that automated concentrate feeding, in comparison to manual feeding is only less stressful for the horse if they receive feed at the same time as the others.

Further advantages of the feed automats are the more flexible work processes as well as less working time. In the automated feed provision application technology in contrast to conventional, manual feeding, an estimated 30 to 50 percent of the normal working time can be saved. Through the distribution of the daily ration into several small portions, metabolism problems or colics can also be avoided as well as behavioural problems, since the horses are busier due to the frequent feeding. In addition, in combination with the open yard husbandry and according spatial divisions of the functional areas, the daily movement of the horses can be increased.

Manure Removal

Daily manure removal from the stables is the largest portion of the working time in both single housing and group housing. Some horse owners prefer stables, where these tasks are carried out by the stable operator or suitable personnel. They prefer to pay a higher rent for the box in order to spend more time with their horses.

In the manure removal in single boxes, generally the manure is gathered and the moist litter is removed manually twice a day. The removal to the manure storage area is generally in wheelbarrows, but can also be carried out mechanically with appropriate mobile technology. Thus, for example, there are containers that are moved from box to box in order to transport the manure away. New stables sometimes have stationary technologies with above- or below ground canals, which remove the manure via conveyor belts, wipers or air pressure. The manure must be manually removed from the box through an opening to the conveyor technology.

In most group husbandry systems, but also in some single housing systems, one often finds use for a mattress of litter. The manure removal is thereby carried out after a certain amount of time with a tractor with front loader or a farmyard tractor. Here it is an advantage if the dividing walls between the individual boxes can be removed and if the resting area in group husbandry has a large entrance with good access and if dividers are portable. The influence of a manure mattress in comparison to daily manure removal on the air quality in the stable will be examined in a further study in the horse research center of the institute, as well as the labor input.

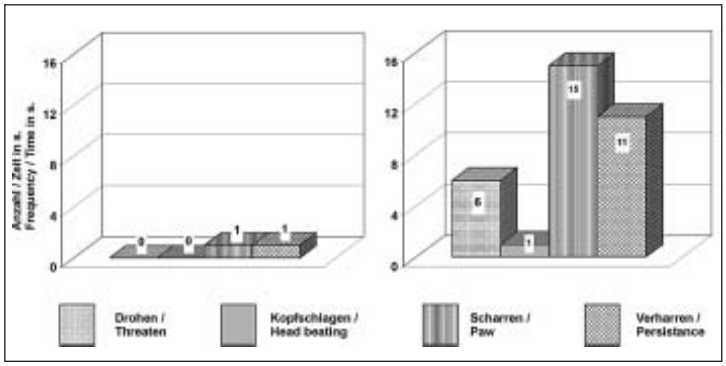

Fig. 3: Behavioural disorders of a horse for direct (left) and for delayed (right) concentrate handling [5]

Conclusions

Technical aids make work easier on one hand and allow for flexible and less time-intensive form of operations in the area of horse husbandry. But also with regard to horse health, the production engineering approach provides solutions for improving animal appropriateness. Thus the development of automatic feeding systems orients itself to the natural requirements for animal appropriate feeding in small portions, which take place simultaneously and thus reduce stress.

Through the continuing gentle movement in the open yard husbandry, the main locomotive diseases are prevented. Additionally the tread mills make a simultaneous exercising of several horses possible leading to a significant reduction of working time and to easier work.

The working time saving through production engineering aids can be used to the advantage of horse care or individual animal monitoring.

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