

TITLE	<b>Lighting of Milking Parlours: Results from a Field Study</b>
YEAR	2022
AUTHOR	Tangorra and Costa
JURNAL	LECTURE NOTES IN CIVIL ENGINEERING - ISSN:2366-2557 vol. 252: 149-154. DOI: 10.1007/978-3-030-98092-4_16
TYPE	Research paper
AIM OF THE STUDY	To investigate the lighting of milking parlours and to assess the impact of the operator and the animals on the illuminance of milking stalls during a regular milking session.
MILKING PARLOR CHARACTERISTICS	Ten milking parlours (herringbone and paralell, 10-40 stalls) with natural light inlets supplemented by artificial lighting, located in Lombardia (Northern Italy).
KEY FINDINGS	Results showed that in most of the milking parlours the light intensity at milking stall is a critical aspect both before and during milking, highlighting the importance in lamps positioning for proper lighting of the udder area.
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TITLE	<b>Illumination levels in milking parlor in dairy cows freestall housing system</b>
YEAR	2020
AUTHOR	Dimov et al.
JURNAL	Bulgarian Journal of Agricultural Science, 26 (Suppl. 1) 2020, 78-82
TYPE	Research paper
AIM OF THE STUDY	- To determine the level of illumination in the milking parlor during milking at different time throughout the day in various seasons; - To determine wheter there is a risk of damage to the milkers' eyesight and to the quality of manipulations they perform during the milking.
MILKING PARLOR CHARACTERISTICS	Double-8 herringbone No windows, roof glass Lighting: fluorescent luminaires.
KEY FINDINGS	The study revealed very low levels of illumination during the autumn and winter seasons. It is necessary the artificial lighting to be corrected to respond adequately to the needs of work process.
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TITLE	<b>The use of integrated data collection system to evaluate milking performance, microclimatic condition and cows' behaviour</b>
YEAR	2020
AUTHOR	Celozzi et al.
JURNAL	Italian Journal of Animal Science 2020, vol.19, no.1, 856-864 <a href="https://doi.org/10.1080/1828051X.2020.1805034">https://doi.org/10.1080/1828051X.2020.1805034</a>
TYPE	Research paper
AIM OF THE STUDY	To assess milking performances, cows' behavior and microclimatic condition in farm areas, using an integrated data collection system, based on surveys and low-cost sensors.
MILKING PARLOR CHARACTERISTICS	Six farms with herringbone milking parlours (on average 17.6 stalls); two farms with parallel milking parlours (on average 18 stalls).  Milking parlour emerged as the area with the worst light intensity during all day in both seasons (winter and summer) and in all the farms analyzed. This result is worrying, because a bad illumination in the milking area can compromise the efficiency of the milking routine, the chance to check udder status and well-being and health of the workers.
KEY FINDINGS	Illumination levels for dairy farms recommended by the Italian National Unification Body (UNI) are 200 lx for milking parlours (UNI:EN 12464-1:2011).
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TITLE	<b>Indoor environment in the milking parlor and cowshed during the milking process</b>
YEAR	2015
AUTHOR	Papez and Kic
JURNAL	Engineering for rural development. Jelgava, 20.-22.05.2015
TYPE	Research paper
AIM OF THE STUDY	To evaluate the results of measurements of the main microclimatic parameters (temperature, relative humidity, carbon dioxide concentration, illumination and noise) in the cowsheds and in the milking parlors during the milking process and compare the measured values with the appropriate standard values.
MILKING PARLOR CHARACTERISTICS	Farm A: rotary milking parlor, 24 stalls; Farm B: tandem parlor (2 x 4).
KEY FINDINGS	Visual (illumination) comfort consistent with the allowable limits (200 lx).
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TITLE	Direct energy consumption and saving possibilities in milk production
YEAR	2015
AUTHOR	Rajanemi et al.
JURNAL	Agronomy Research 13(1), 261–268, 2015
TYPE	Research paper
AIM OF THE STUDY	To provide an indication of the direct energy consumption and potential savings in milk production.
MILKING PARLOR CHARACTERISTICS	
KEY FINDINGS	<p>Lighting is an animal welfare question but also proper lighting is needed for human workers. In lighting the trend is to replace incandescent light bulbs with more energy efficient lamps. Luminous efficacy of the bulb can be calculated by dividing the bulb lumen value by the electric power consumption of the bulb. The higher this value, the more energy efficient the bulb is. Incandescent light bulbs' efficacy is 10–15 lm W<sup>-1</sup>, energy saving lamps have 50–70 lm W<sup>-1</sup> efficacy (Tetri et al., 2011). LED lights can have higher efficacies. For instance LED light bulb efficacies varied in tests from 57 to 110 lm W<sup>-1</sup> (Premium Light 2015).</p> <p>Good natural lighting can be achieved with 10–15% transparent roof area (DairyCo, 2012).</p> <p>Dunn et al. (2010) noticed that during two year period the light intensity was reduced by 30% because of dirt. Gooch &amp; Ludington (2003) recommend that the lights should be cleaned in 6 months periods.</p> <ul style="list-style-type: none"> <li>• Tetri, E., Raunio, J. &amp; Halonen, L. 2011. Lamppuopas (In Finnish, Lamp Info). Aalto-yliopisto, Sähkötekniikan korkeakoulu, Valaistusyksikkö, Espoo. <a href="http://www.lightinglab.fi/ekovalo/News/lamppuopas.pdf">http://www.lightinglab.fi/ekovalo/News/lamppuopas.pdf</a> (accessed January 2015), 12 p;</li> <li>• PremiumLight 2015. <a href="http://www.premiumlight.eu/">http://www.premiumlight.eu/</a>. (accessed January 2015);</li> <li>• DairyCo: Dairy housing – a best practice guide. 2012. DairyCo, a division of the Agriculture and Horticulture Development Board, Warwickshire, UK, available at <a href="http://www.dairyco.org.uk/resources-library/technical-information/buildings/dairyhousing-a-best-practice-guide/">http://www.dairyco.org.uk/resources-library/technical-information/buildings/dairyhousing-a-best-practice-guide/</a> (accessed July 2013);</li> <li>• Dunn, P., Butler, G., Bilsborrow, P., Brough, D. &amp; Quinn, P. 2010. Energy + efficiency, renewable energy and energy efficiency options for UK dairy farms. Newcastle University, 2010, available at <a href="http://www.morrison.co.uk/Global/0_FarmingPage/Energy%20Efficiency%20Options%20for%20UK%20Dairy%20Farms.pdf">http://www.morrison.co.uk/Global/0_FarmingPage/Energy%20Efficiency%20Options%20for%20UK%20Dairy%20Farms.pdf</a> (accessed 12.1.2015);</li> <li>• Gooch, C.A. &amp; Ludington, D.C. 2003. Lighting Design Considerations for Employment of Photoperiod Management in Freestall and Tiestall Dairy Barns. In Fifth International Dairy Housing Proceedings of the 29–31 January 2003. Fort Worth, Texas USA. pp. 95– 104.</li> </ul>
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TITLE	<b>Effect of lighting on the growth, development, behaviour, production and reproduction traits in dairy cows</b>
YEAR	2014
AUTHOR	Penev et al.
JURNAL	Int.J.Curr.Microbiol.App.Sci(2014)3(11) 798-810
TYPE	Research paper
AIM OF THE STUDY	
MILKING PARLOR CHARACTERISTICS	
KEY FINDINGS	<p>The research of Abrosimova (1978) found out that adequate light intensity during milking could shorten the process by 8-12%. The necessary minimum light intensity for milking is 60-80 lx and this level assists milking in the parlour and increases labour efficiency of milkers. Rist et al. (1974) recommend illuminance of 240-250 lx during milking. The current legislation in Bulgaria stipulates light intensity of 100 lx/m<sup>2</sup> (Ordinance /20.04.2006). Some authors propose minimum lighting in the different parts of the barn, pointing out a light flux of 100 lx in the waiting room before entering the parlour (Clarke and House, 2006), and 200 lx in the milking parlour (Clarke and House, 2006; Miteva, 2012). Proper lighting could influence oxytocin release and hence, milking (Mačuhova and Bruckmaier, 2004).</p> <ul style="list-style-type: none"> <li>• Abrosimova R. 1978. Effect of lighting on gaseous excretion and productivity in larger ruminants. Anim.Sci.,(RU)(2):8788;</li> <li>• Rist, M., Berthoud, A., Heusser, H. 1974. Über Beleuchtung und Beleuchtung in Ställen, unter besonderer Berücksichtigung der Beleuchtungsverhältnisse in neueren schweizerischen Rindviehställen;</li> <li>• Ordinance No.44/20.04.2006 for veterinary medical requirements to animal rearing facilities;</li> <li>• Clarke, S., House, H. 2006. Energy efficient dairy lighting. Agricultural engineering, Ontario, Order06007;</li> <li>• Miteva, Ch. 2012. Hygienic aspects of free range production systems for dairy cows. Monograph, Academic Publishing House of the Trakia University;</li> <li>• Mačuhova, J., Bruckmaier, R.M. 2004. Diurnal changes of oxytocin release during automatic milking. In: Meijering, A., Hogeveen, H., deKoning, C.J.A.M. (Eds). Automatic Milking A Better Understanding. Wageningen Academic Publishers, Wageningen, The Netherlands, 502 pp.</li> </ul>
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