The scientific foundations for preparing a model of the necked shoe for the (Cowboy) type according to the foot and leg measurements of Egyptian women aged 20-30

Prof. Nadia Mahmoud Khalil

Professor and former head of the leather industries department, Faculty of Home Economics - Helwan University, dr_nadiakhalil@yahoo.com

Dr. Sana Mohamed Fathy

Assistant Professor, Department of Leather Industries, Faculty of Home Economics - Helwan University, sanaa.fathi@heco.helwan.edu.eg

Bsant Mohamed Mahdy

Teaching assistant, Department of Leather Industries, Faculty of Home Economics - Helwan University, bsantmohamed60@gmail.com

Abstract:

The research aims to identify the method for preparing a model of the ankle boot (Cowboy) according to the correct scientific principles for measuring the feet and legs of Egyptian women aged twenty to thirty years (20-30). The research adopted a descriptive methodology appropriate for the current study. It involved conducting detailed anthropometric measurements of the foot and leg using the correct scientific method to achieve accurate measurements for the feet and legs of Egyptian women. Measurements were taken from a sample of one hundred and four (104) Egyptian women, with ages ranging from twenty to thirty years (20-30), from several governorates in the Arab Republic of Egypt (Cairo, Giza, New Valley, Port Said, Qalyubia) to ensure a diverse geographic representation from many governorates in Egypt. The results of the research provided accurate statistical data that can be used in developing the design and preparation of shoe models in particular and the shoe industry in general, ensuring consumer comfort and improving the quality of local production. This was done by reaching averages of measurements for the dimensions of the feet and legs of Egyptian women to be used in the practical study for preparing a model of the ankle boot (Cowboy) (the type of boot under current investigation) according to correct scientific principles and the statistical results of these measurements, due to the lack of an Egyptian measurement chart specific to the feet and legs of Egyptian women, particularly in the age group under current investigation.

Paper History:

Paper received February 21, 2025, Accepted April 02, 2025, Published on line July 1, 2025

Keywords:

Shoe models, boots, and foot measurements.

References:

- 1- Ituntaş, E, & Uzun, A. (2022). Estimating Height and Body Weight Using Foot Measurements. Middle Black Sea Journal of Health Science, 8(1), 74-86. https://dergipark.org.tr/en
- 2- Banerjee, A, PGGIPE, B, & Bengal, W. (2015). Comparative Study of Selected Physiological and Body Composition Variables of Runners Jumpers and Throwers. International Journal of Research, 1. http://dx.doi.org/10.51983/arss-2012.1.1.1181
- 3- Castelli, K, Zaki, A. M. A, Dmytriyev, Y, Carnevale, M, & Giberti, H. (2020). A feasibility study of a robotic approach for the gluing process in the footwear industry. Robotics, 10(1), 6. https://www.mdpi.com/journal/robotics
- 4- Chertenko, L. (2020). Development of a boot-tree mold for manufacturing riding boots. Індустрія моди. Fashion Industry. https://pm.knutd.edu.ua/bitstream
- 5- Chute, E. E. The Effect of Shoe Sizing System on South Indian Ladies. International Journal of Engineering Research & Technology (IJERT Vol. 9 Issue 06, June-2020) .https://www.ijert.org/
- 6- Gwani, A. S., Salihu, A. T., Garba, I. S. I., & Rufa'i, A. A. (2017). Estimation of stature from radiographic measurement of foot dimensions: Truncated foot length may be more reliable than full foot length. Journal of Forensic and Legal Medicine, 46, 53-57. http://dx.doi.org/10.1016/j.jflm.2017.01.004
- 7- Hamzah, M. F. M, Rijal, O. M, Kimura, K, & Noor, N. M. (2019). Malaysian women shoe sizing

system using multivariate normal probability distribution. IEEE Access, 7, 142726-142737 http://creativecommons.org/licenses/by/4.0/

- 8- http://celerisridingboots.com
- 9- https://pubs.nmsu.edu
- 10- Kim, Y., Song, H. K., & Ashdown, Susan. P. (2012, November). Analysis of Petite Sized Women's Figures Based on SizeUSA Data: An Assessment of Petite Sizing Systems Used in the US Apparel Industry. In International Textile and Apparel Association Annual Conference Proceedings (Vol. 69, No. 1). Iowa State University Digital Press. (https://www.iastatedigitalpress.com)
- 11- Kutnjak-Mravlinčić, S., Akalović, J., & Bischof, S. (2020). Merging footwear design and functionality. AUTEX research journal, 20(4), 372-381. http://creativecommons.org/licenses/by/4.0/).
- 12- Limon, M. I. K, Uddin, M. E, Hossin, M. M, & Rahman, M. S. (2023). Development of new shoe sizing system for women based on regression analysis of foot shapes. International Journal of Industrial Ergonomics, 94, 103408. https://doi.org/10.1016/j.ergon.2022.103408
- 13- Loranger, D., & Divita, L. (2023). Texas Cowboy Boots: America's Material Culture Melting Pot. The Journal of American Culture, 46(1), 14-22. https://chappellboots.com/about/
- 14- Mauch, M, Grau, S, Krauss, I, Maiwald, C, and Hortsmann, C, 2008. Foot morphology ofnormal, underweight and overweight children.International Journal of Obesity, 32 (7), 1068–1075. http://www.nature.com/ijo
- 15- Mei, Z, Ivanov, K, Zhao, G, Wu, Y, Liu, M, & Wang, L. (2020). Foot type classification using sensorenabled footwear and 1D-CNN. Measurement, 165, 108184. https://doi.org/10.1016/j.measurement.2020.108184
- 16- Mia, A. S., Alam, N., & Uddin, M. K. (2017). Court shoe production line: Improvement of process cycle efficiency by using lean tools. Leather & Footwear Journal, 17(3), 135-146. https://doi.org/10.24264/lfj.17.3.3
- 17- Nikbakht, A, & Ahmadikia, H. (2023). Optimum design of the geometry of boots and socks with the aim of minimum weight and preventing frostbite. Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine, 237(12), 1366-1376. https://journals.sagepub.com/
- 18- Paiva, R. M, Marques, E. A, da Silva, L. F, António, C. A, & Arán-Ais, F. (2016). Adhesives in the footwear industry. Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications, 230(2), 357-374. https://journals.sagepub.com/ DOI: 10.1177/1464420715602441
- 19- Tomassoni, D, Traini, E, & Amenta, F. (2014). Gender and age related differences in foot morphology. Maturitas, 79(4), 421-427. https://doi.org/10.1016/j.maturitas.2014.07.019
- 20- www. Pinterest.com
- 21- Xu, M, Li, J. X, Hong, Y, & Wang, L. (2019). Foot morphology in Chinese adolescents aged between 13 to 18 years varies by gender and age. Medical Science Monitor: International Medical Journal of Experimental and Clinical Research, 25, 937. https://www.medscimonit.com/abstract/index/idArt/912947

CITATION Nadia Khalil, et al (2025), The scientific foundations for preparing a model of the necked shoe for the (Cowboy) type according to the foot and leg measurements of Egyptian women aged 20-30, International Design Journal, Vol. 15 No. 4, (July 2025) pp 233-246