

IEGR 360: ERGONOMICS AND WORKPLACE DESIGN

FALL 2019

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Assignment 2: (Individual/digital submission to my Morgan email before 5:00 PM Friday November 8th)

Ergonomic design of carpet weaving hand tools

Instructions

Read the journal paper identified in the next page. Describe the main elements of the published paper in a report and submit it as a PDF file. Your report should include, at least the following elements:

- tools designed, improvements over previous tools and how the improvements were measured.
- how the data were collected and whether statistical analysis was performed.
- ergonomics principles used in the design

I also recommend that for those of you who have never seen the process of carpet weaving, to look at a couple of videos from YouTube to understand the role of tools in the process.

Abstract

This study was conducted in Iranian carpet industry to determine the prevalence of upper limb problems associated with hand tools

design, investigate the design of hand tools currently used in carpet weaving operation, and design/redesign the tools based on

anthropometric dimensions and ergonomic principles. This study consisted of two phases. In the first phase, 862 weavers from three Iranian provinces participated. A questionnaire consisting of personal details, Nordic Questionnaire for upper limbs and a table for anthropometric dimensions of hand was used to collect the required data. In the design phase, the study focused on designing/redesigning the weaving comb, knife and scissors as the most common tools in carpet weaving operation. Based on the first phase results, three prototypes of the hand tools were made in this phase. Usability test was conducted to assess comfort and applicability of the designed hand tools and the weavers' perceptions. Ten experienced weavers participated in this test. Statistical analyses revealed significant differences between the scores of the old and the new designed tools. There was a significant preference towards the comfort and applicability of the prototypes ($p < 0.01$). The new ergonomically designed weaving hand tools were found to be applicable and acceptable by the carpet weavers.

Source:

Title: Ergonomic design of carpet weaving hand tools

Authors: Majid Motamedzadea, Alireza Choobinehb, Mohammad Amin Mououdic, and Shirazeh Arghamid

June 2007. International Journal of Industrial Ergonomics 37(7):581-587

doi: 10.1016/j.ergon.2007.03.005

Available from ResearchGate:

https://www.researchgate.net/profile/Shirazeh_Arghami2/publication/223575196_Ergonomic_design_of_carpet_weaving_hand_tools/links/5a7ee4040f7e9be137c5dd01/Ergonomic-design-of-carpet-weaving-hand-tools.pdf