

Recommended Product Design Parameters for School-Age Children's Woodworking Hand Tools

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ABSTRACT

A large variety of hand tools are used when engaging in woodworking activities. Children of different age groups need to choose hand tools suited to their individual development and ability. This study uses the databases of Google Scholar, ScienceDirect, and Springer and the keywords of “hand tools design,” “children’s hand tools,” and “physical development of children” to find the relevant publications published between 1980–2020. Using content analysis, the author defined three children’s age groups based on individual physical differences—6–8, 8–10, and 10–12 years old—and further summarized from said publications the recommended design parameters that need to be considered for woodworking hand tools: handle size, handle diameter (full-hand grasp and precision grasp), and weight (overall weight, one-handed handling, and precision handling). The national anthropometric measurements of Taiwanese adults’ hand size (hand width and length) and grip strength were used to develop the recommended design for adults’ woodworking hand tools before comparing the measurements with the hand size (hand width and length) and grip strength of school children of the three different age groups. The recommended ranges of design parameters for woodworking hand tools suited for school children of different age groups are then determined in proportion to those of adults and can serve as reference for the design of tools suited for school children engaging in woodworking activities.

Keywords: school-age children, school-age children development, hand tools, woodworking hand tools, ergonomic design