Workplace Health and Safety
Bulletin

Good Product Design — Avoiding the Average

Have you ever wondered why you can't reach the controls on that piece of equipment? Or the top tier of shelving? Do you find it a tight squeeze to get through the man opening, or always bump your head on certain doorways?

These are examples of how designers often make the big mistake of designing for the average person. The problem is, very few people are average. A good design takes into account that people vary widely in size and shape. Controls and shelves should be reachable by the shortest person. Man openings should be designed for the widest person (including clothing and equipment) and doorways for the tallest person.

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The 90 per cent solution

Since it's not usually practical to design products that fit all workers, good designers disregard extremes of body size, that is, the smallest and largest 5 per cent. Many designers manage to meet the needs of 90 per cent of people by allowing the equipment or product to be adjusted. For example, seating and work surfaces may adjust up, down or sideways, or be designed to tilt.

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It is therefore vital that designers know something about the "group" that will be using the product. Body size varies depending on ethnic background, gender and age. Females are smaller than males in most dimensions, and as age increases, many adults become shorter but heavier.

Body dimension information, called anthropometric data, is available in many ergonomic textbooks. The data typically provided includes various heights (overall, shoulder, elbow, hip, knee, sitting); breadths (head, shoulder, hip, hand, foot); lengths (shoulder-elbow, elbow-fingertip, hand, foot) and grip reaches of the hand.

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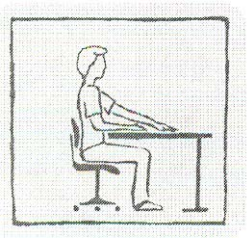
Clearance and reach

A workspace must provide enough headroom, legroom, elbow room, etc. to allow a person to work safely. Handles and openings for hands must be large enough to allow for large hands to get in and out easily. Designing clearances for the largest person — at the top end of the 90 per cent range — means that there will always be enough clearance for smaller persons as well.



The location of controls or the height of shelving depends on the distance a person can reach. Designing reach distances for the smallest person — at the bottom end of the 90 per cent range — means that controls and shelving are always within the reach of larger persons.

So why do designers get it wrong?

Failing to consider the size and shape of the person using the product is the main reason. The thinking goes that if the product suits the designer (based on his or her size and shape), it must be good enough for everyone else. Wrong.

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The second line of thinking is that if the product is good enough for the average person, it must be good enough for everyone else. Wrong again. Designers should be using readily available body size information and avoiding the average.

And finally, there's an assumption that everyone's needs can't be met and that good design is too expensive. Also wrong. Meeting the needs of 90 per cent of the population is not that difficult. A good design will pay for itself by keeping users happy and safe.

For more information

www.ergonomics4schools.com/lzone/workspace.htm
"Workspace," part of the Learning Zone's Ergonomics 4 Schools

Fitting the Task to the Human: A Textbook of Occupational Ergonomics by K.H.E. Kroemer and E. Grandjean, Taylor & Francis, 5th edition, 1997.

Bodyspace: Anthropometry, Ergonomics and the Design of Work by S. Pheasant, Taylor & Francis, 2nd edition, 1996.

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