Workplace Health and Safety
Bulletin
WORK SAFE ALBERTA

Determining The Size Of An Access Opening

The question was simple. How big should the opening in a structure be to allow a person to pass through it?

The immediate response was to ask more questions. Who will pass through the hole? What type of clothing or specialized equipment will the person be wearing? Is the opening vertical or horizontal?

Ultimately, the answer to the question came from anthropometry, a fancy word for the part of ergonomics that deals with body size and physical abilities such as strength. Because people come in all shapes and sizes, the products – and openings – they use have to be designed to suit their physical characteristics and abilities. This principle applies to something as simple as the shape and softness of the grip on a pen, or as complex as the design of a car.

Scientists and ergonomists have measured the body dimensions of thousands of people, both male and female, and of different age groups and nationalities, in order to create anthropometric tables. These tables allow designers to create products – including access openings – that meet the needs of the people who use them.

If access openings are designed for a person of average height and width, some people will have a difficult time getting through them. The openings must therefore be designed to suit the largest individual who will pass through it, that is, a male at the "tall and large" end of the measurement scale, known as the "95th percentile male". This would allow 95 per cent of all users to get through the opening.

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In safety-critical situations, however, 95 per cent may not be good enough. The designer may have to go one step further and design for the "tallest and largest", or the 99th percentile male, so that 99 per cent of users can pass through the opening.

Access to work areas such as pressure vessels can be a problem. The opening may need to be large enough to allow emergency evacuation (perhaps even by two people carrying a stretcher) but at the same time as small as possible so that the strength of the vessel is not affected.

If the opening will be used during winter operations, the final measurement must take into consideration that users will be wearing bulky clothing. And lastly, the dimensions have to comply with any applicable legislation requirements.

Resources

- http://employment.alberta.ca/documents/WHS/WHS-PUB_erg030.pdf
  Good Product Design – Avoiding the Average

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

- EN Standard 547-1 *Safety of Machinery – Human Body Dimensions – Part 1: Principles for Determining the Dimensions Required for Openings for Whole Body Access into Machinery*

- EN Standard 547-2 *Safety of Machinery – Human Body Dimensions – Part 2: Principles for Determining the Dimensions Required for Access Openings*

- EN Standard 547-3 *Safety of Machinery – Human Body Measurements – Anthropometric Data*

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