Sizing up Australia

The Next Step
Defining the Method and Scientific Parameters for the Australian Body Sizing Survey
Hometrica Conference
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November 2013

Safe Work Australia - SWA project sponsor
Concerns about safety in design and outcomes of poor design on worker health and safety
About this presentation

- Research questions?
- Evidence based
  - Application and use of anthropometry (WHS) – how can it add value?
- Stakeholder driven
  - What the survey would give us?
  - Usefulness of types of surveys
- Project outcomes
Research questions

1. What should an anthropometric survey deliver?
2. What components make it useful?
3. Aspects of the project need “measure of goodness” tests – will it work?
4. Will it be fit for purpose?
Project Method

- Literature review
  - published and grey literature
  - International practice
  - ISO standards

- Defining the method and scientific parameters for the Australian Body Sizing Survey thus
  - outlining the factors influencing budget and resources
Engineering / design anthropometry

SCOPE – is it fit for purpose?

- Design and assessment of:
  - Worn products
  - Built environments
- Uses in engineering, ergonomics and design include:
  - Maximum benefit and capability of products
  - Checking early product design at concept stage
  - Evaluation of existing designs and work spaces
Types of anthropometric data

- 1-D
- 3-D
- 4-D dynamic data
- Fit metrics
- Fit mapping
Stakeholder driven
What do designers want?

- Deliver outcomes that are evidence based
- Anthropometric data that are*:
  - Reliable - represent user population
  - High quality - including 3-D and 1-D
  - Accessible - on-line preferred
  - Affordable
- Applications eg case selection, simulations…

Use of anthropometric data

- Evaluation of new designs – 1-D and 3-D data used together
  - can best be represented by **cases** that uses a combination of body measurements
  - e.g. average or extreme measurements from a sample,

- Evaluation of existing design
  - design parameters relative to fit, function and safety
  - identification of designs that exclude or are biased towards workers of with particular body size attributes
Surveys and usefulness for engineering design

Technical Solutions summarising different possible approaches

<table>
<thead>
<tr>
<th>Ability to accurately predict future body shape and size</th>
<th>Extra High</th>
<th>High</th>
<th>Low</th>
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<tr>
<td>Extra High</td>
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<tr>
<td>High</td>
<td>1-D (traditionally) using manual landmarks</td>
<td>1-D (traditionally) + 3-D using manual landmarks</td>
<td>Collect 1-D (traditionally) using manual landmarks</td>
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<tr>
<td></td>
<td>3-D scans</td>
<td>Buy scanner, calipers and tapes (like CAESAR).</td>
<td>No scanner (like ANSUR, many older surveys)</td>
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<td>Lease scanner</td>
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<tr>
<td>Low</td>
<td>Fully automated 3-D scans which extract 1-D</td>
<td>Collect 1-D (traditionally) using manual landmarks</td>
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<tr>
<td></td>
<td>Buy scanner like TC2 (like SizeUK and Size USA)</td>
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High Precision; High Cost; High Future Potential, Extra-High Usefulness for Industry and Government

- 1-D (traditionally) + 3-D using manual landmarks
- 3-D fit metrics in the product = fit-mapping study with stakeholders
- 4-D dynamic data
- Buy scanner, calipers and tapes. (first time this type of survey will be done)

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<th>Expenditure</th>
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Findings

- Key areas for a high quality effective survey
  - Traditional style 1-D and 3-D data types provide different information and both are essential
  - new 4-D (high quality 3-D scans captured while the subject is in motion) could provide a cost effective way to capture fit information
  - Early stakeholders engagement is vital
  - ISO Standards provide basic templates but they are not sufficient
  - A systems-engineering approach balancing technical factors, cost, time, and needs, is required
Sizing up Australia - The Team

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National Research Council Canada

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Acknowledgements
Dr John Field – statistical advice, Mr Eric Ennis, Dr Jeff Hudson and Dr Greg Zehner – provision of images and grey literature, Mr David Summerhayes – preparation of graphics, Griselda Raisa Susanto – administrative support
Thank you

Work sponsored by CODATA

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