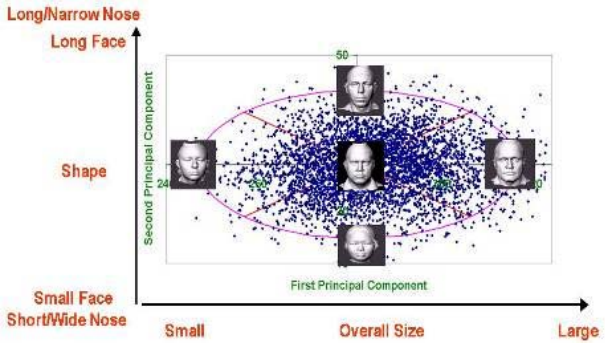
Development of Computer-Aided Face-Fit Evaluation Methods – FY12 (927ZKRJ)

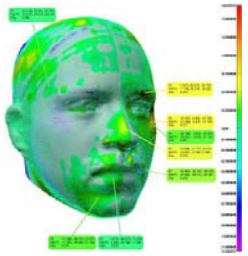
Objective

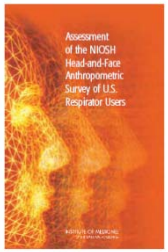
- Establish up-to-date respirator fit-test panels and test headforms to be incorporated into the national and ISO standards
- Develop an anthropometric database of Asian workers
- Investigate the correlation between 3-D parameters and face fit



Applicable Standards Related Activities

- ISO TC94 SC15 WG1 PG5
- 29 CFR Part 1910.134





Stakeholders

- OSHA, MSHA, ANSI, ISO
- Respirator Users
- Manufacturers

Key Partners

- Texas Tech University
- Canada National Research Council
- Tongji Medical College, China
- Florida State University
- NIOH, South Africa
- Instituto de Salud Pública (ISP), Chile

Project Scope

- Develop an anthropometric survey detailing the face size distributions of respirator users using both traditional measurement methods and three-dimensional (3-D) scanning systems
- Investigate the extent to which facial features can predict respirator fit and protection
- Develop respirator fit test panels using the traditional bivariate approach and the principal component analysis (PCA)
- Develop test head forms

Milestones FY12

- Q1 Complete shape analysis by Dennis Slice
- Q2 Complete the report for NRC Canada contract
- Q3 Submit a paper on shape variations of U.S. workers to OD
- Q4 Submit a paper on headforms for Chinese workers to OD

Outputs

- Manuscripts published or submitted to peer review journals (**16**)
- Presentations at conferences (**21**)
- Standards committee meetings & public meetings (**12**)

Outcomes

- The techniques and methods developed in this study resulted in the ability of manufacturers to design respirators with improved face-fitting characteristics (**9** outcomes were achieved since 2011)
- Fit Test Panel and head forms incorporated in respirator testing and certification and ISO standards
- Outputs have been cited **60** times in the peer-reviewed literature
- Chile and South Africa have adopted the anthropometric survey methodology for studies on the characteristics of their populations

Updated: 01 April 2012