

Biomechanical and Physiological Study of Firefighter Boots – FY12 (927ZKRH-1)

Objective

The primary objective of this study is to determine the effect of boot weight and design on firefighters' biomechanical and physiological responses. 3rd phase testing focused on trips and falls. 27 (13 women, 14 men) firefighters wore four different boot models while stepping over obstacles and climbing a ladder.



Ladder climb



Obstacle Cross

Applicable Standards

- NFPA 1971

Key Partners

- NFPA

Stakeholders

- Fire departments and firefighters
- Firefighter boot manufacturers

Project Scope

- To evaluate the effect of boot weight and design on men and women firefighters' oxygen consumption, peak flows, joint loading, dynamic balance, and gait characteristics
- To provide much needed scientific data to the NFPA 1971 standards committee (Protective Ensemble for Structural Fire Fighting) to revise and update standards

Milestones FY12

- Q2 Phase 3 manuscript published online in Human Factors
- Q2 Phase 2 manuscript submitted to journal
- Q4 Submit Phase 3 ladder manuscript to OD
- Q4 Submit trade article with all-phase results to OD

Outputs

- Presentations at conferences (**6**)
- Standards committee presentations and public meetings (**5**)
- Published manuscripts in peer-reviewed journals (**2** published, **3** in preparation)

Outcomes

- Standards organizations use outputs to make improvements in firefighter boot standards and by boot manufacturers to produce lighter boots
- Outputs are cited by other researchers working on firefighter PPE or footwear

Updated: 2 April 12