



Procurement Criteria to Minimize Hand-Arm Vibration Risk

**DoD Industrial Hygiene Forum
American Industrial Hygiene Conference
Minneapolis-St Paul, MN
June 3, 2008**

**Mark Geiger, MS., CIH, CSP
OPNAV Safety Liaison Office (CNO N09FB)**

Outline

- Project objectives
- Anti-vibration gloves
- Power tools
- Challenges
- Relevance to future projects



Hands of vibrating pneumatic hand-tool operator in later stages of irreversible Hand Arm Vibration Syndrome¹

Project Team

- Army
- Navy
- Headquarters U.S. Coast Guard
- Air Force Research Lab
- Defense Logistics Agency, Headquarters
- Government Services Administration
- Contract Support
 - Coordinated by Concurrent Technologies Corporation for OSD Personnel and Readiness (P&R)
 - Don Wasserman (Vibration expert)
 - Robbins Gioia (Logistics Contractor)

Defense Safety Oversight Council

Hand-Arm Vibration Project Task Objectives

- Provide **procurement guidelines** for anti-vibration gloves and power hand tools that will reduce personnel exposure to crippling hand-arm vibration exposures while reducing noise exposures and promoting process efficiency (Completed Feb 08)
- Support GSA/DLA procurement of special **anti-vibration gloves** which reduce the vibration transmitted to the fingers and hands during tool use. (In process, required information provided)
- Support the Federal (GSA/DLA) procurement of more modern designs for **powered hand tools** meeting current performance criteria for reduction of transmitted vibration to the hands when in use (Ongoing)
- Incorporate criteria for **3rd party evaluation** of vibration for gloves and tools into procurement criteria (Completed Feb 08)
- **Communicate** this information **to logistics and safety communities** via DLA, GSA, NIOSH and Service websites. (Linked to updated product availability)

Vibration Exposure Guidelines

- ACGIH Threshold Limit Values (TLVs)
Range 4-12 m/s² based on duration and dominant frequency-weighted, rms, component acceleration
- European Union Directive 2002/44/EC of 25 June 2002
- ANSI S2.70-2006 Guide for the Measurement and Evaluation of Human Exposure to Vibration Transmitted to the Hand
 - Daily Exposure Action Value (DEAV) 2.5 m/s²
 - Daily Exposure Limit Value (DELV) 5.0 m/s²

Anti-Vibration Gloves (AVG): ISO 10819/ANSI S2.73 Criteria

- Specifies screening test for vibration transmission from a handle to the palm of the gloved hand in the frequency range from 31.5 Hz to 1,250 Hz
- Must fulfill both Transmissibility for Vibration (TR) in Medium (31.5-200 Hz) and High (200-1250 Hz) ranges
 - $TR_M < 1.0$ & $TR_H < 0.6$
- Fingers of the glove have must be of the same materials and thickness as the part of the glove covering the palm of the hand

Anti-Vibration Gloves (AVG): The Problem

- Many gloves marketed as AVG do not meet the criteria of ISO 10819/ANSI S2.73
 - These include 2 products in the GSA system as National Stock Number (NSN) items
- There are no US regulations for manufacturers to test, certify, and label gloves that meet the ISO/ANSI criteria
- Products currently marketed by GSA as “anti-vibration gloves” do not meet these criteria

AVG: The Approach

- Develop procurement criteria consistent with anti-vibration standard and incorporate into GSA procurement (Completed at NIOSH meeting 2-08)
 - Evaluate compliance with ANSI S2.73 for all gloves intended for use where vibration is a hazard
 - Develop estimates of glove use from current glove National Stock Numbers (completed 5-08)
- Develop a plan to address the need for AVG and ways to procure only ANSI S2.73 compliant gloves

AVG: The Approach (cont)

- The GSA tool division has initiated a project to create a new item description for anti-vibration gloves which will be associated with the stock class for power tools
 - Eliminates confusion associated with placing gloves with other products intended for other uses
- Develop detailed communication and marketing plan
- Crosslink GSA, DLA, NIOSH and Service websites
 - This should provide noise and vibration information to assist tool users and procurement agents in the selection process
 - GSA access is willing to post information vibration issues on website

Power Tools: The Problem

- ANSI adopted the European Union Directive in ANSI S2.70 (2006), but it does not contain specific criteria as does the ANSI S2.73 for AVG
- There are no US regulations for manufacturers to test, certify, and label power tools
- Limited prior customer input to GSA/DLA for reduced vibration or noise

Power Tools: The Approach

- Evaluate power hand tools where vibration is a hazard
- Establish procedures for the Qualified Products List (QPL)
- Evaluate possible approaches to facilitate and document labs which can provide testing and evaluation
- Crosslink GSA, DLA and NIOSH websites
- Make improved products available via GSA schedule both to Federal and Federal contractor buyers
 - Contractors can buy through GSA for certain government projects

Power Tool Selection Criteria and Request For Vendors Information

- 3rd party report of transmitted vibration
 - Measured in accordance with ANSI 2.70 and NIOSH guidelines under standard, specified conditions
- Air blow off directed away from hands
- Other ergonomic criteria (somewhat dependent on product)
 - Weight – balance – grip dimensions of handle
 - Surface area and force of trigger
 - Recoil or impulse (different than “steady state” vibration)
 - Wrist deviation associated with use
- Consistency with design guidance, noise and vibration to be weighted factors in selection
 - Minimum eligibility criteria likely to be established for the Qualified Products List (QPL) for specific equipment and products
 - Data may be reported in item description and reflected in GSA, DLA and safety/health websites
- Consider warning labels as needed re: noise and vibration

Challenges

- Educating industrial hygienists to understand and engage in existing processes for feedback and glove and tool improvement
- Educating safety and industrial hygiene managers to understand the importance of improving worker gloves and tools as opposed to traditional surveys and reports
- Streamlining and clarifying current processes and policies
 - Establishing new policies and procedures, if needed

Challenges (cont.)

- Incorporating risk management in glove and tool selection
 - Involves identifying and communicating with responsible technical authorities and program offices
- Communication

Relevance to Future Projects

- **Many common support items and equipment are outdated and lack**
 - Technical ownership and fiscal sponsorship
 - Feedback from fleet, IH and safety
 - Process owners and acquisition programs focus on newer systems and equipment with reduced focus on sustainment
- **Recent case studies where safety and health intervention improved “neglected” products**
 - Aviation support (flight deck) cranial
 - Combat arms earplug
 - Shipboard fall protection harness
 - Current “anti-vibration” gloves
 - Army “soldier systems” focus on process management and coordination of efforts to outfit soldiers
- **Need to coordinate efforts to provide feedback that makes changes (not just more reports)**
 - Educate the field to be more demanding customers
 - Learn and use “the system”

Resources

- Navy Acquisition Safety Vibration Website:
<http://www.safetycenter.navy.mil/acquisition/vibration/default.htm>
- NIOSH Vibration Website:
<http://www.cdc.gov/niosh/topics/ergonomics/>
(scroll down to vibration)
- GSA Advantage Website:
https://www.gsaadvantage.gov/advgsa/advantage/main/start_page.do
- Handout of ANSI compliant gloves