Lesson 3

Visual Health Surveillance

Healthy Workplaces
Working together for risk prevention

[Graph showing the relationship between stress, pressure, and performance]
Lesson 3

Outline

• Visual Health & Work
  • Prevention of visual occupational risks & hazards
  • International standards and normatives

• Occupational Visual Requirements

• Visual Health Prevention Programme
  • Detection and feedback using questionnaires
  • Vision screeners vs. optometric practice

• Discussion
  • Supplementary reading and learning
  • Proposed activity no. 2
Bibliography & Links

• Basic:
Lesson 3

Bibliography & Links

• Basic:
  • CEN website: [CEN logo]
  • INSHT website: [INSHT logo]
  • OSHA website: [OSHA logo]
  • ISO website: [ISO logo]
  • AENOR website: [AENOR logo]
Visual Health & Work

• Ergonomics and its link with Occupational Health
  • **First:** to get a safe task
  • **Second:** to fit it at comfortable level
• Senses & Cognition
  • Stress and workload
  • Decision making
• Control
  • Safety, accidents and human error
• Engineering anthropometry
  • Biomechanics of work
  • Work physiology
• **Work-space design**
Visual Health & Work

• Occupational Health: occupational illness vs. accident
Visual Health & Work

- Work & Prevention
  - Trade unions
Visual Health & Work

- **Ergonomic approach** for stress and workload: tasks available to individual capabilities, applicable to any field

![The Yerkes-Dodson Human Performance and Stress Curve](image)

- **Optimal performance**
  - Aim to keep employees at this performance level

- **Performance**
  - Seeing improvement
  - Energised
  - Focused
  - Work feels effortless
  - CALM

- **Stress**
  - Fatigue
  - Exhaustion
  - Ill Health
  - Breakdown & Burnout
  - DISTRESS

- **Stress**
  - Bored
  - STRESS
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Visual Health & Work

• Prevention of Occupational Hazards in Spain

• Law 31/1995 Prevention of Occupational Hazards
  • Rights & Obligations for employers and employees

• RD 34/1997 Prevention Services for Occup. Hazards

• Psychosocial and ergonomic factors
  • Prevention and action protocol guides
Visual Health & Work

- International standards and normatives:
  - Search documents by official website: eye, vision, etc
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Occupational Visual Requirements

• Objective:
  • Detect workers whose visual performance is below the required visual standard

• Advantages:
  • Recruitment, as part of the interview
  • Identification of visually impaired workers
  • Improved employee – employer relationship
  • Once improved visual efficiency / performance
    • Productivity ↑, costs ↓, accidents ↓, absenteeism ↓
  • Claims for compensation can be solved easily
Occupational Visual Requirements

• Preamble:
  • Different tasks require different visual requirements (national standards). Example: driving

• Objective:
  • Find the relationship between the visual and performance / competence at work

• Starting problems:
  • Easily analyze the vision of the worker, but it is difficult to relate it to their workplace competency
    – Non-visual factors: age, intelligence, attitude, manual ability, etc.
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Occupational Visual Requirements

- Phases:
  - Choose a method to qualify job competence
    - Supervision of a specialist or professional, quality / quantity of output, frequency of accidents, absenteeism, etc.
  - Analyze visual factors necessary for the task
    - Checklist of visual job analysis
  - Decide the criteria for visual competence:
    - AV, stereopsis, ortho-vision, color vision, etc.
  - Analyze the vision of the "competent" and "non - competent"
  - Compare the classification of visual competition with labor competition
    - If the visual standard is correct, the visually incompetent must be in the group of "incompetent“ ones
Visual Health Prevention Programme

• Remind:
  • The employer is primarily responsible for the safety of workers
    • Investment in a program of eye & visual prevention

• Objectives:
  • To identify potential ocular / visual hazards, and eliminate or control
  • The use of eye protection equipment should be the last option
  • Benefits / Consequences of the implementation of the program:
    • Effective with the law on prevention of occupational risks
      Economic benefits: accidents ↓, costs ↓, production ↑, etc.
Visual Health Prevention Programme

- Phases of an eye & visual prevention program:
  - Detection and prevalence estimation using questionnaires
  - Review of the work environment
    - Checklist of visual job analysis
    - Visibility factors and calculation of visual performance
  - Vision analysis
    - Vision screeners vs. optometric practice (periodically)
    - Occupational visual requirements
  - Implementation / Execution: international standards
    - Visual signaling
  - Program Maintenance
    - Continuous monitoring, statistical control, meetings, training
      - New questionnaires
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Visual Health Prevention Programme

• Detection and prevalence estimation using questionnaires:
  • 7th Spanish Questionnaire of Work Conditions
  • Other specific examples for computer vision syndrome, etc

• Improvement techniques:
  • AGREE instrument
  • Sensibility and efficiency
  • Etc

• Initiatives from standardisation organisations and Governments??
Visual Health Prevention Programme

- Visual signaling (RD 485/1997)
  - Signs into a panel / display:
    - Warning
    - Ban
    - Obligation
    - Firefighting
    - Rescue
  - Illuminated & acoustic signs
  - Verbal communications
  - Gestural signs
Vision screeners vs. optometric practice

• Modified Clinical Technique (I):
  • Actions required:
    • History and symptoms
    • VA far / middle / near distance
    • External eye examination
    • Retinoscopy
    • Accomodation amplitude
    • Binocular Vision
      – Ocular motility, ZVBNH, stereopsis, phorias, strabismus
    • Field of View
    • Color vision
      – battery tests for dischromatopsia
Vision screeners vs. optometric practice

• Modified Clinical Technique (II):
  • **Advantages**:
    • Flexibility depending on the type of visual task
    • Type and amount of refraction
    • Detecting eye diseases
    • Reduced number of false re-emissions
  • **Disadvantages**:
    • High costs when using professional and specialized instruments
    • Processing time
    • Shortage of optometrists wishing to join in programs for job vision analysis: Optometry Clinical Center at the University of Alicante
    • Interesting occupations: watchmakers / jewelers, toymakers, packers, tele-operators using displays, masons, etc.
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**Vision screeners vs. optometric practice**

- **Vision screeners (I):**
  - **Optical design:**
    - Brewster – Holmes stereoscope
    - Self internal lighting
    - The tests are inserted into the instrument
    - Manual or automatic control
  - **Types of eye exams**
    - VA: far, intermediate, near
    - Heterophoria: horizontal / vertical, far / near
    - Stereopsis: near / far
    - Fusion binocular
    - Color vision
    - Visual field
    - Astigmatism, etc.
Vision screeners vs. optometric practice

• Vision screeners (II):
  • **Advantages:**
    • Low economic cost
      – Used in health prevention services
    • Manageable by non-professionals in vision sciences
    • Fast, always available
    • Low maintenance
  • **Disadvantages:**
    • Lack of flexibility depending on the work environment
    • It does not measure the illuminance level of task
    • No detect eye diseases or strabismus
    • Presence of relative esophoria for proximal or mind C / A
    • Presence of false positives, or vice versa
Supplementary reading and learning

• BSc Thesis (TFG), academic year 2012-13: “Analysis of 7th Spanish Questionnaire of Work Conditions from a Visual Health approach”

• Read this document

• Why it is interesting?

• Applicability level??

• Initiatives for improvement??
Proposed activity nº 2

- Relative Weight: 2.5 %
- Delivery process by course blog
- Individual Task:
  - Search visual ergonomics standards or normatives using CEN, INSHT or AENOR websites:
  - Propose one, but different from the rest of examples provided for other students. Justify why you choose it and its interest for this lesson or the rest of this subject.