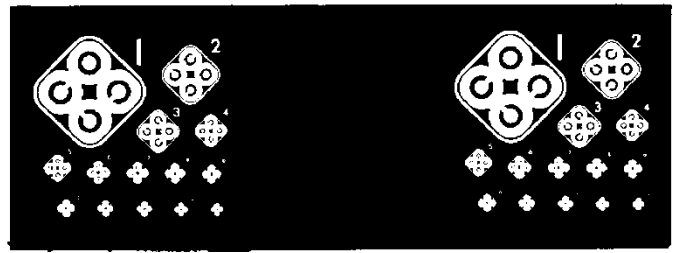
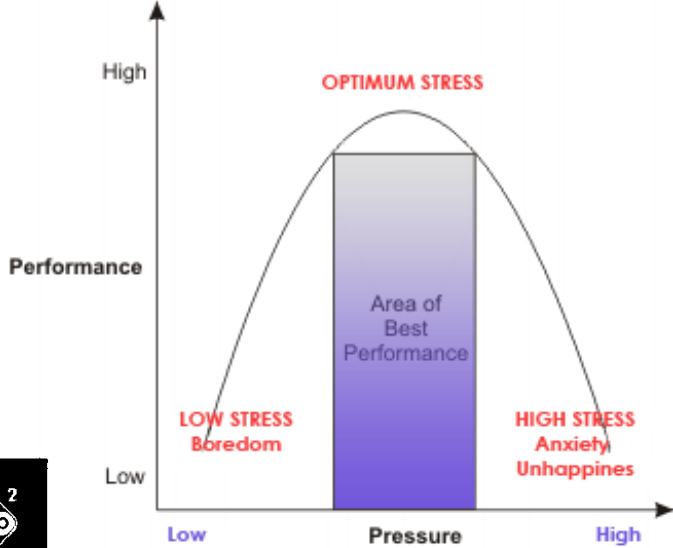
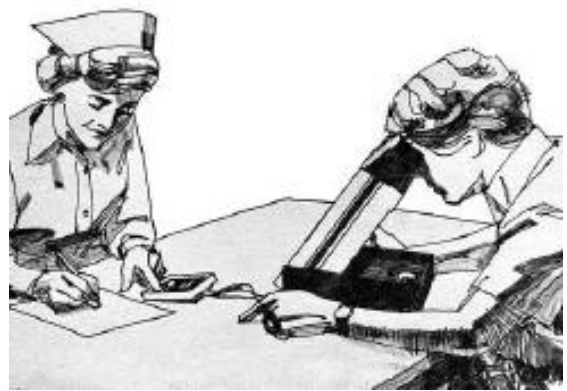


Visual Health Surveillance

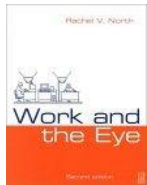


Outline

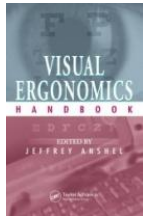
- **Visual Health & Work**
 - Prevention of visual occupational risks & hazards
 - International standards and normatives
- **Occupational Visual Requirements**
- **Visual Health Prevention Programme**
 - Detection and feedback using questionnaires
 - Vision screeners vs. optometric practice
- **Discussion**
 - Supplementary reading and learning
 - Proposed activity no. 2

Bibliography & Links

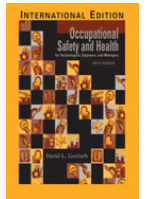
- **Basic:**



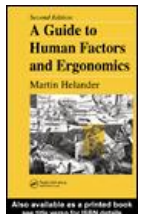
- **NORTH, R.V.:** *Work and the Eye*, 2nd ed., Oxford: Butterworth-Heinemann, 2001.



- **ANSHEL, J.:** *Visual Ergonomics Handbook*. Boca Raton: CRC Press, 2005.



- **GOETSCH, D.L.:** *Occupational Safety and Health for Technologists, Engineers, and Managers*, 5th ed., New York: Prentice Hall, 2004.



- **HELANDER, M.:** *A guide to human factors and ergonomics*, 2nd ed. London: CRC Press, 2005.

Bibliography & Links

- **Basic:**

- **CEN website:**



European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

- **INSHT website:**



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EN EL TRABAJO

- **OSHA website:**



UNITED STATES
DEPARTMENT OF LABOR

- **ISO website:**

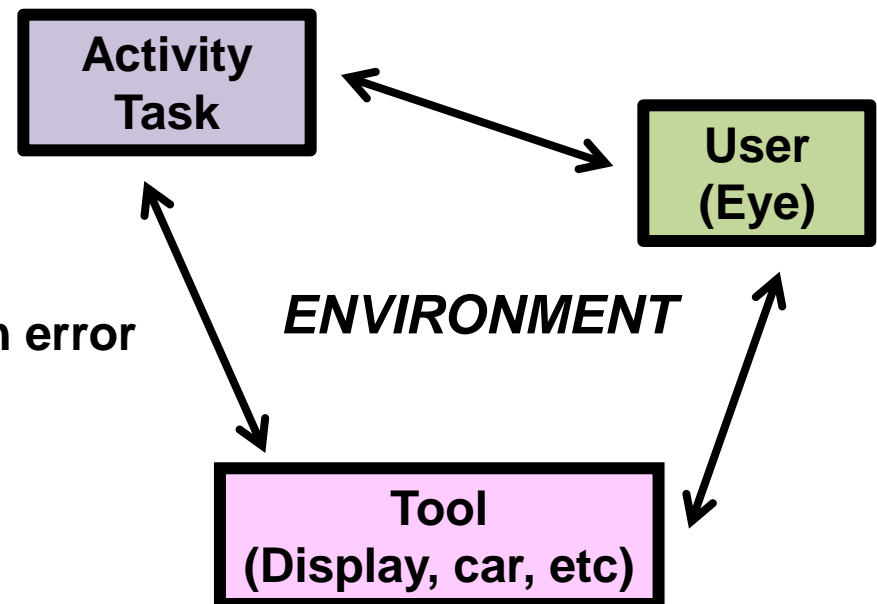


International
Organization for
Standardization

- **AENOR website:**

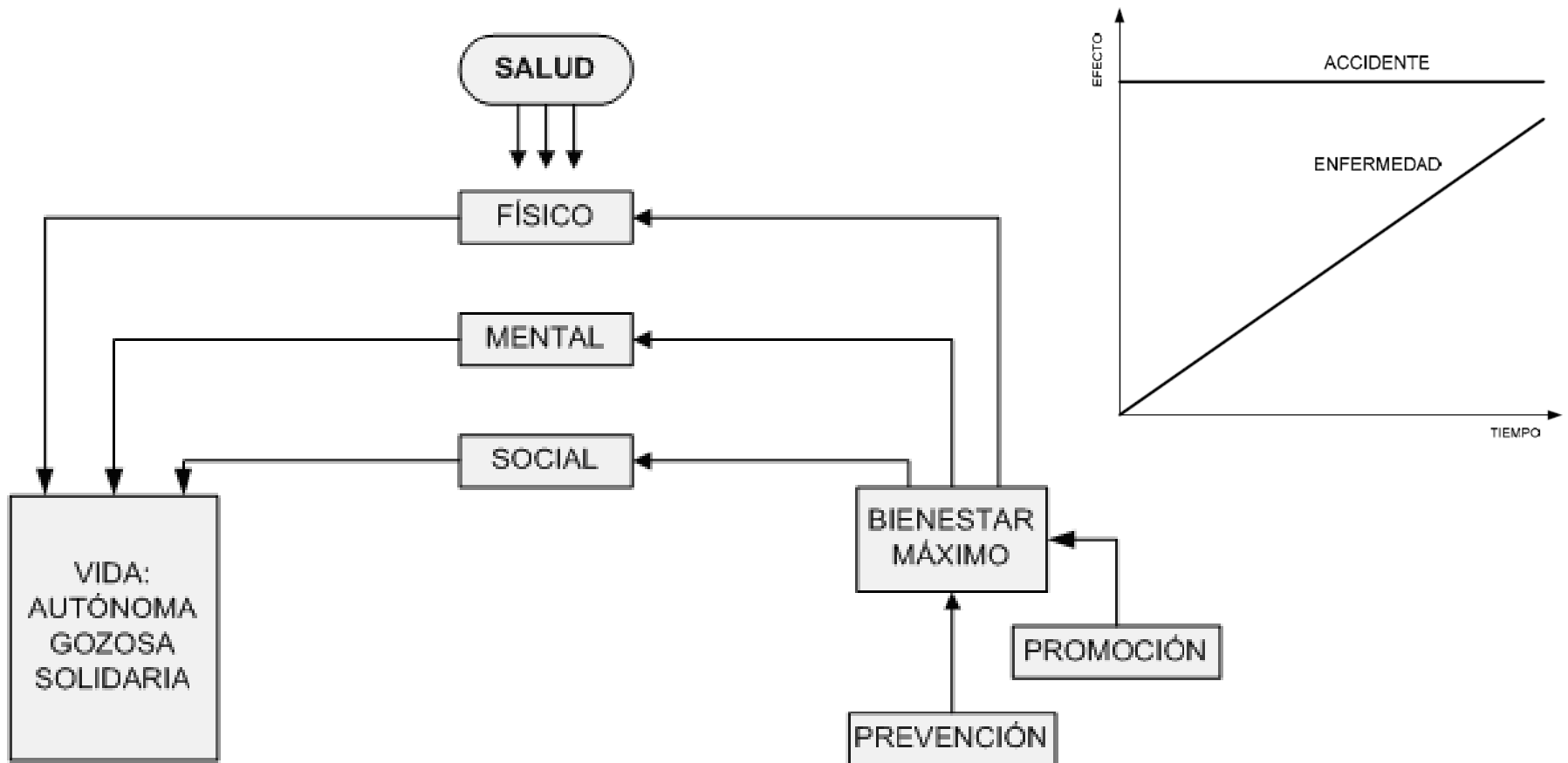
Visual Health & Work

- 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



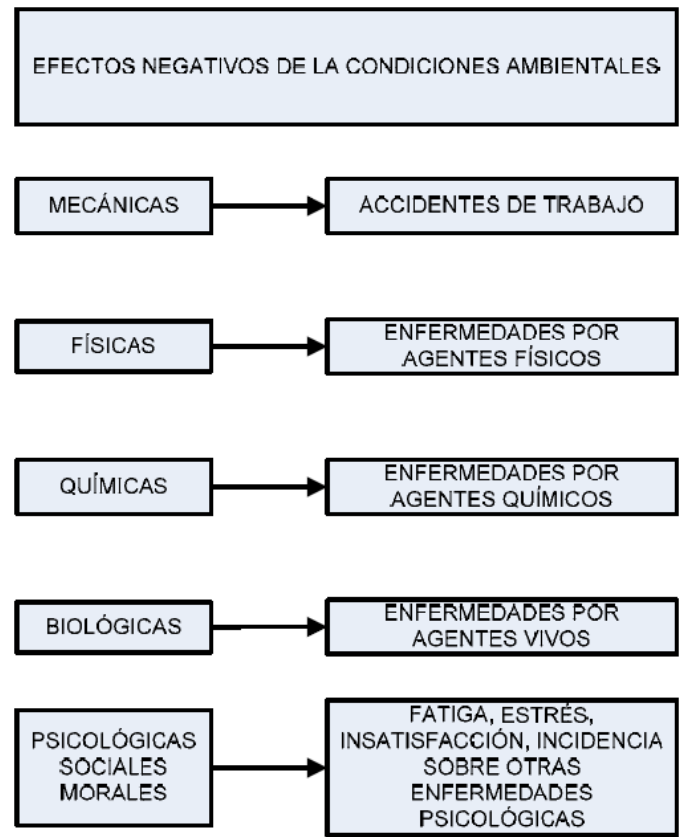
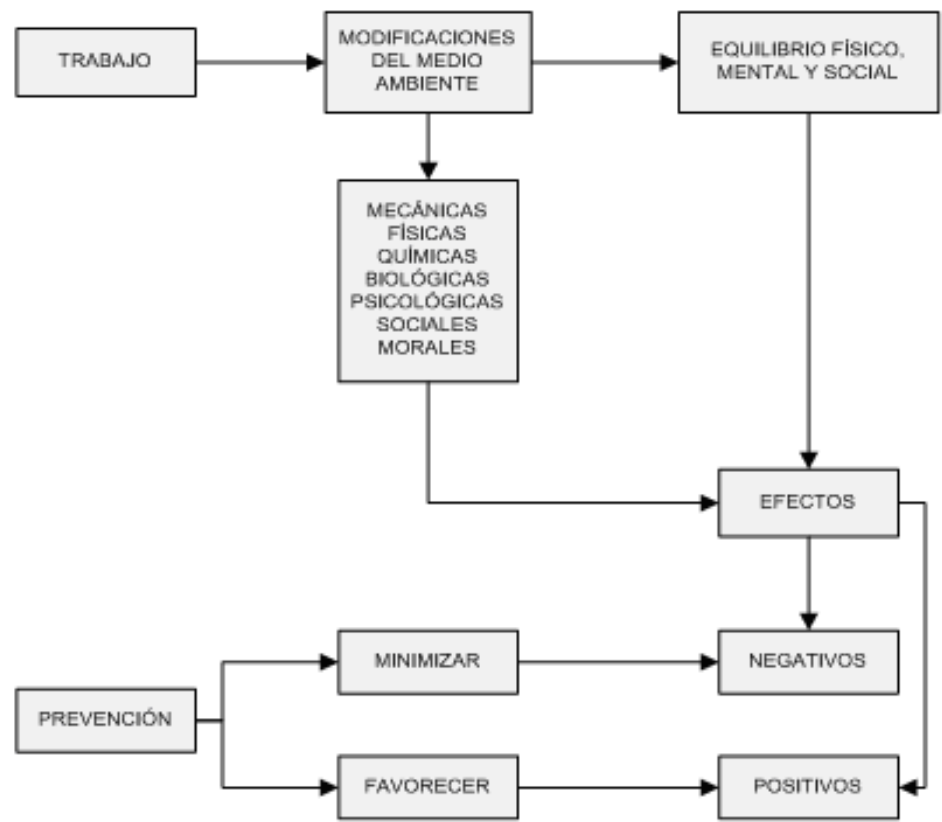
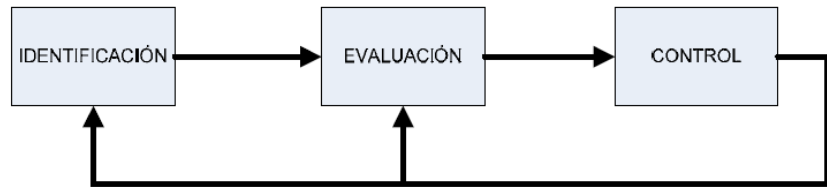
Visual Health & Work

- 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

Figure 1: The Yerkes-Dodson Human Performance and Stress Curve



Visual Health & Work

- Prevention of Occupational Hazards in Spain



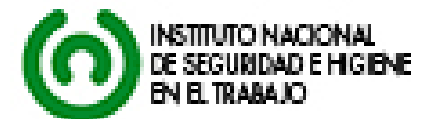
- Law 31/1995 Prevention of Occupational Hazards
 - **Rights & Obligations** for employers and employees
- RD 34/1997 Prevention Services for Occup. Hazards
- Psychosocial and ergonomic factors
 - Prevention and action protocol guides

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.

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

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

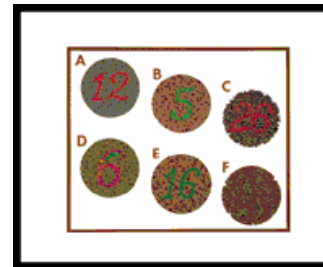
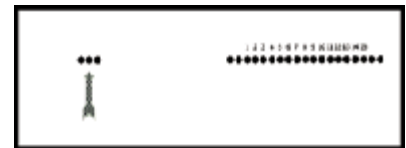


Vision screeners vs. optometric practice

- **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.

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

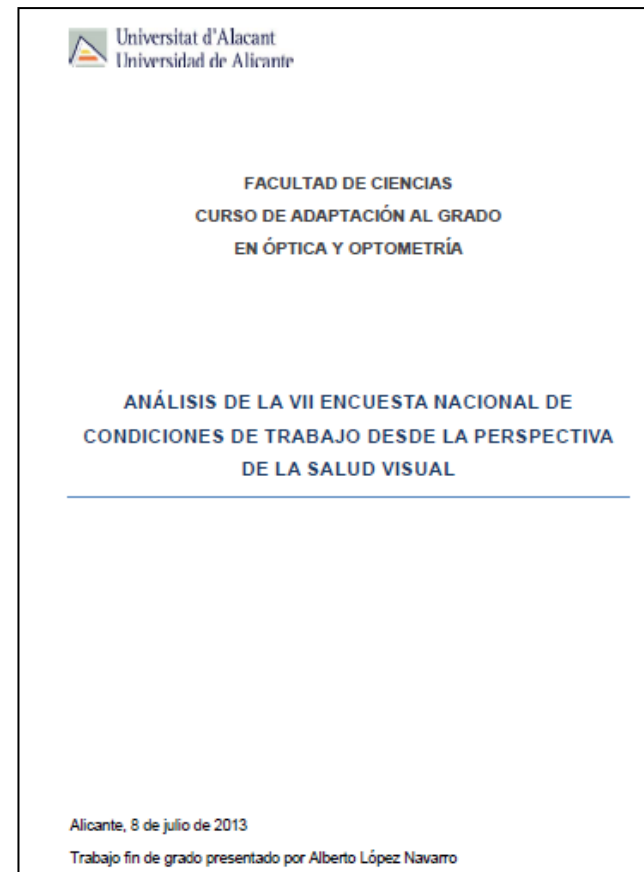
- Disadvantages:

- 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:**



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- **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.**