

## Safety and Ergonomic Risk Management for Visual Stress. A Theoretical and Experimental Case

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**Abstract** – Ergonomic studies must consider numerous elements such as human – machine interactions (hardware ergonomics), human environment interactions (environmental ergonomics), human – organization interactions. The paper presents a theoretical and experimental study on safety and ergonomic risk management for visual stress, developed during an internship period.

**Keywords:** Ergonomic, health, safety, risk, visual stress, standard, evaluation, prevention, VDT, results

### I. INTRODUCTION

Occupational health and safety have always played a role over time more important.

The legislation on the subject has undergone significant changes both at national and at national level European. Occupational safety prevention has long been underestimated: it is with Legislative Decree 626/94 which is witnessing its reevaluation and, even more so, with the Legislative Decree 81/2008.

An effective preventive system can be considered as the preparatory basis on which to be able develop the entire corporate safety system, prevention intended as complex of measures to be implemented in order to anticipate the potential development of a hazard, starts from a careful assessment of the possible risks present and passes through the processing of the prevention document up to the planning of a real study programmatic, aimed at monitoring, maintaining and improving conditions over time security within a company.

### II. BS OHSAS 18001: CONTENTS, PURPOSE AND REQUIREMENTS

The OSHAS 18001 standard is currently the only international standard for certification of Occupational Health and Safety Management Systems. It includes BS OSHAS 18001 (Occupational Health and Safety Management Systems) [2], responding to market

demand for a standard that allowed the assessment and certification of conformity of health management systems and job security. Compatible with standards for quality and environmental management systems, it allows the integration of quality, environment and safety management systems, where required [3].

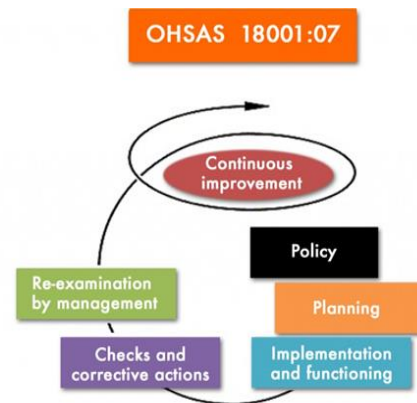


Fig. 1. The BS OHSAS 18001 standard

### III. INTEGRATION OF THE INTERNSHIP PROJECT

The following chapter will address the analysis and subsequent assessment of the inherent risks the ergonomics and visual stress to which the employees of the Step Sud company are subjected Mare, located in Pomigliano d'Arco, operating in the transport and design sector vehicle in which I carried out an inspection during the internship period that I carried out from 07/06/2017 to 06/08/2017 at the company PSB consulting S.r.l., a company a Limited liability with various locations operating in different regions of Italy. From the beginning I had the opportunity to view some examples of Evaluation Documents of Risks: the document must primarily contain the corporate registry and the organization chart security. To obtain this information, an inspection must be organized

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technician at the company being assessed and collect all information necessary to do the job. So to put into practice what I could learn, I took the SSM company.

#### IV. THE COMPANY PROFILE

Born in 2012, Step Sud Mare is the synthesis of two important realities in the world of design industrial: Step Sud Srl and Mare Engineering SpA. Thanks to a team of about 150 collaborators, develops over 250,000 hours / year of engineering activities, with two offices in Italy (Pomigliano d'Arco and Turin) and two abroad (Slovak Republic and Brazil).

Focused on vehicle design and technological innovation in the automotive sector transport (Automotive, Aerospace, Railway, Industry) SSM covers, on an international scale, all the industrial engineering sectors: EWC, Cad, R&D, Manufacturing and Logistics. Always engaged in research, SSM collaborates with numerous universities. Among his clients are Ferrari, FCA, Hitachi Rail, Adler Group, Abarth, Cira, Maserati and many others.

#### V. THE USE OF WORKSTATIONS WITH VDT (VIDEO TERMINALS)

In more recent years, the use of workstations with video terminals (VDT) has suffered an abrupt acceleration. This phenomenon has produced significant transformations in the normal course of business work activities but also represented the cause of the onset of risk factors on the workplace.

To assess the risk associated with carrying out one's work activity in workstations equipped with VDT, reference is made to aspects of ergonomics of vision. In the assessment of lighting risk in fixed workstations with VDT it will be necessary to consider both the ergonomics implications of the vision that derive from relationship between the worker and the screen (human-machine interface) and the implications agents on the specific visual task (e.g. reading on the screen) in relation to lighting general of the work environment (human-environment interface) [4].

#### VI. MAIN RISK FACTORS

The disturbances that video terminal workers can accuse are visual and eye disturbances; problems related to posture; physical and mental fatigue.

As for the operating methods, the main risk factors that can be the causes of the disorders are the high stress on the organs of vision and their rapid fatigue; wrong body position; physical or mental fatigue. Their relevance is closely related to the duration of the exposure. Let us analyze each of them schematically risk factors listed above:

Solicitation of the organs of vision; body position; physical or mental fatigue [5].

### VII. CRITERIA AND METHODS OF EVALUATION

To carry out the study on the use of equipment equipped with a video terminal, work was carried out on the following way; Two types of questionnaires were used:


one of an objective nature, taken care of in the compilation by a group of operators prepared, who carried out the investigation by checking the individual VDT jobs and their location in the various offices;

another of a subjective nature, distributed to all operators involved in the planned activity by VDT.

### VIII. EVALUATION RESULTS

Problematic conditions relating to conditions are highlighted in the assessment environmental (noise, microclimate and lighting). In relation to these risk factors, instrumental recognition was not made but the possible need for targeted investigations in this sense is derived from the assessment of the entity of the subjects who, in the subjective questionnaire, highlighted problems for each of the parameters in question.

When one emerges from the results of the subjective evaluation questionnaire significant percentage of dissatisfied people in relation to the number of complaints per location / office analyzed, it was deemed necessary to proceed with an instrumental analytical study of the highlighted condition.

	Use of video terminals (office activities)	P	D	R	Level
	art. 172 e seguenti del d. Lgs. 81/2008	3	2	6	3 medio

$$R = P \times D \text{ formula}$$

### IX. PREVENTION MEASURES

All workers exposed to a risk from using equipment equipped with video terminals for 20 hours per week will be subjected to health surveillance by integrating the surveillance programs envisaged for other risks.

In addition, employees will undergo training and information on the specific risk of using equipment with video terminals.

If prescribed by the competent doctor, ophthalmic lenses or other special visual correction devices should be used.

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