PhD in Management, Production and Design
Os&h in critical ATECO codified activities

Research Title: Criteria for improvement and dissemination of Occupational Safety and Health - OS&H Culture in critical ATECO codified activities

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<th>Funded by</th>
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<th>Context of the research activity</th>
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| In all industrial and construction activities the development of a specific design and management culture (implying full synergy of management and employees as actors with different tasks and skills) is a basic requirement for the development sustainability. A very important subset of such a culture is the Culture of Safety, which can be conceptualized and synthesized as the understanding of the interactions between cultural and contextual variables in a given scenario, and the effect they have on safety. 

As is clear from the consultation of national and international databases on work related accidents and occupational diseases, (see e.g. the data recorded by the National Institute for Insurance against Accidents at Work – Inail, and the European Agency for Safety and Health at Work (European Observatory Risk – ERO)) the situation in critical ATECO codified activities is still certainly worthy of attention (see e.g. [1], [2]). The general panorama appears quite complex, since in the mentioned ATECO codified sectors a number of external parameters strongly condition the OS&H situation, such as the general and local economic context, changes in employment strategies and contracts, and growing presence of foreign workers. Therefore, preventive actions (actions taken to prevent the occurrence of unwanted events) are certainly necessary, together with corrective actions (taken to prevent recurrence).

As confirmed by the study of a number of accident case histories, analyzed in detail thanks to the information deriving from prosecutor’s appointment and the use of a computer assisted event analysis and prevention identification technique specially developed (CCCP, see e.g.[3]), the main accident root causes are due to:
- poor Risk Assessment and Management – RAM;
- poor Information, Formation and Training – IFT of the victim and colleagues.

Both the mentioned causes are attributable to an insufficient "Culture of Safety", this being a general problem, with particularly serious consequences when critical ATECO activities are involved.

The evolution of the approach to the OS&H problems, in accordance with the statements of the EC Directives laying at the very base of the National law and regulations on the health and safety of workers at work (see [4], [5], involves the need of widespread diffusion of a Culture of Safety. Such a culture should be based on the principles of motivational training, and include all the people involved at the different levels of responsibility.

On this basis, the target of an effective prevention can be reached, also in complex situations, within a system strictly correlated with the technical measures for minimizing the risks which cannot be eliminated (i.e. based on approaches in Prevention through Design – PTD [6] and Quality Management of the activities).

James T. Reason [7], clearly points out that the safety education should not be limited solely to meet the standards, and intended only to the workers, since effective OS&H conditions require a System Approach based on a thorough Risk Assessment and Management special for the analyzed situation.

Coherently, the Culture of Safety should be the result of an appropriate dissemination in all areas and at all levels, starting from specialized training on Safety Management Systems and high university education, where research special for critical Ateco activities can be developed (e.g. see [8]), together with training courses on the up to date results.

As said, the effective quality and sustainability of a system requires the fulfillment of the OS&H principles, which in turn requires a correct RAM.

It is therefore necessary to establish:

- a rigorous definition of the operative scenarios, and a coherent selection of techniques and technologies suitable to face possible incidental chains. This requires a project conceived by designers with adequate Culture of Safety, and the subsequent implementation (e.g., in the case of constructions, the result depends on the culture of people responsible of the safety and coordination plans);

- the inclusion in such scenarios, and at the different levels, of operators aware of their responsibilities vs safety, and able to distinguish whether the situation conforms with the design conditions, or presents deviations (faults, disconformities, etc.): these should be immediately identified, to introduce the necessary remedial measures.

The objective of the present PhD project is to provide a methodological contribution to the promotion of the Culture of Safety, with special reference to the technical OS&H aspects in critical ATECO codified activities, through the definition of innovative approaches, their effectiveness and practicality validation, and dissemination to National Safety and Health Inspectorates, and to Designers and Safety staff figures.

The PhD research work contemplates the fulfillment of the following phases:

1st year:

- updating and critical discussion of work related accidents and health impairments statistics, and identification of one or more critical ATECO codified activities, to focus in detail the research developments;

- analysis of the evolution of techniques / technologies and epidemiological knowledge in the selected Ateco activities, through both literature and on site investigations;

- organization of a systematic collection of detailed Italian and foreign case histories on work related accidents and health impairments;

- preliminary tests of in-depth analysis of the case histories Intermediate and Root Causes, and Prevention measures definition, by means of the CCCP technique. This phase will be developed at first with the software release presently available, as exemplified in [9], [10]; if necessary, the software will be further refined.
2nd year:
- continuation of the case histories collection and in-depth analysis of events, and structured organization of the resulting Root Causes and Prevention Measures: at the purpose, the data storage capabilities of the CCCP software will be further developed;
- discussion of the results of the previous phase in PTD and Safety in quality management criteria for specific issues seen as example cases. The activity will be based on further improvements of the approaches discussed in [11] in terms of general safe design approach, in [12],[13] in terms of reliability of the design input data, in [14],[15],[16],[17] in terms of definition of fittings and machinery, in [19],[20] with reference to the results of in-depth event analysis.

3rd year:
- continuation of the work of the 2nd year, in particular with reference to the data collection and analysis, and the deriving discussion on the best prevention measures and techniques suitable for different situations;
- development of models of IFT, on the basis of a further improvement, special for the selected ATECO activity considered, of what than can be found in literature and is used in industries and construction sites, and/or discussed in [21], [22] [23], and dissemination tests;
- development of forms for controls of efficacy, and discussion of the results (a model of form -special for the assessment of satisfaction, problems of use, and efficiency of high protection PPE to be used in tunneling operations with potentially critical formation pollutants- is at present under evaluation and the results can be used as a reference);
- dissemination of the final results;
- preparation of the final PhD report.

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<th>Skills and competencies for the development of the activity</th>
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<td>For an effective development of the activity, the following skills and competences are recommended:</td>
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<td>- expertise in the field of science and techniques of OS&amp;H, in particular with regards to the Hazard Identification and Risk Assessment and Management in the critical ATECO codified activities;</td>
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<td>- experience on suitable approaches to the definition of the dynamics of occurrence of work related accidents and health impairments, on data mining in National and foreign data bases on the subject, and on computer models specially conceived for in-depth analysis of the chain of events leading to the accident root causes and identification of suitable prevention measures;</td>
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<td>- basics in advanced training sciences, specifically for the ATECO contexts under exam.</td>
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