

An Innovating Methodology for Measuring The Effective Implementation of OHSMS (Occupational Health And Safety Management System) in Small and Medium Scale Industries

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Abstract – The small and medium scale enterprises(SME) have immense growth in the recent years due to the social and economic development of the country, but the safety aspects followed in the SME are very poor, and it becomes highly risky to the employees life, so safety aspects in SME requires huge amount of improvement. In this thesis we propose behavior of small and medium scale industry for safety management. The first target of the industries has to improve the implementation of Occupational Health and Safety Management Systems, especially for small and medium enterprises (SMEs). Safety investments are uncompetitive if compared to other investments, especially for SMEs, due to responsibility attribution management that does not guarantee the exemption of responsibility in the case of unpredictable accidents and to an insufficient incentive policy for enterprises, virtuous in safety investments. For SMEs safety investments are un-profitable also because the individual SME has no real perception of accident risks due both to difficulties in assessing and monitoring the real risk and to the small number of employees. The project has introduced an index (Efficacy Index) to objectively quantify the effective implementation of an Occupational Health and Safety Management System (OHSMS). The paper shows how the index can be practically applied to a company and what kind of information can be collected and processed to determine the effective implementation of the OHSMS. It helps to reduce the accident rate and incident rate of SMEs, highlighting the safety awareness in SMEs from the management level to the employee in order to improve the safety management in SMEs.

Keywords – SME, OHSMS, safety investments, Scale etc.

I. INTRODUCTION

The first target is to improve the implementation of Occupational Health and Safety Management Systems, especially for small and medium enterprises (SMEs). Safety investments are un-competitive if compared to other investments, especially for SMEs, due to responsibility attribution management that does not guarantee the exemption of responsibility in the case of unpredictable accidents and to an insufficient incentive policy for enterprises, virtuous in safety investments.

For SMEs safety investments are un-profitable also because the individual SME has no real perception of accident risks due both to difficulties in assessing and monitoring the real risk and to the small number of employees. So introduced an index (Efficacy Index) to objectively quantify the effective implementation of an Occupational Health and Safety Management System (OHSMS). The paper shows how the index can be

practically applied to a company and what kind of information can be collected and processed to determine the effective implementation of the OHSMS. The paper also aims to define a procedure to demonstrate the exemption of responsibility of a company in the case of an unpredictable accident and to allow further reduction of assurance premiums. In fact, only the exemption of responsibility for employers through effective implementation of the OHSMS, together with an adequate incentive policy, can significantly improve occupational health and safety.

A safety management system is a series of defined, organization-wide processes that provide for effective risk-based decision making related to your dailybusiness.SMS focuses on maximizing opportunities to continuously improve the overall safety of the aviation system. A safety management system provides a systematic way to identify hazards and

control risks while maintaining assurance that these risk controls are effective

II. THE KEY PERFORMANCE

- Hazard Identification – a method for identifying hazards related to your organization,
- Occurrence Reporting – a process for the acquisition of safety data,
- 3. Risk Management – a standard approach for assessing risks and for applying risk controls
- Performance Measurement – management tools for analyzing whether the organization’s safety goals are being achieved
- Quality/Safety Assurance – processes based on quality management principles that support continuous improvement of the organization’s safety performance.

III.SAFETY MANAGEMENT SYSTEM

Many Industries in India have been employed and implemented their risk Assessment System, such as safety management system, control of major accident hazards or other occupational safety and health – such as safety audit. All the state Governments has a separate department, Department of Inspectorate of Factories for enforcing and educating safety to all employees in industries.

The main function of the department is to ensure and maintain health, safety and welfare of the workers employed in large, medium and small scale industries. In India MAH regulations has been introduced by ministry of lab our and employment, Government of India.

III. BLOCKDIAGRAM OF SAFETY MANAGEMENT SYSTEM METHODOLOGY

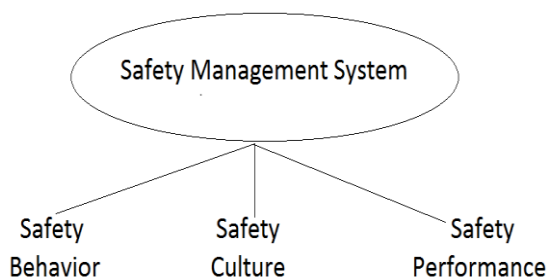


Fig.1 Block diagram.

IV.METHODOLOGY

The consequent cost together with insurance cost and prevention cost gives .the total un-safety costs that are charged both to enterprises and the community. Analyzing the individual cost items according to

time,the prevention cost is expected to progressively increase its relative incidence compared to the others, but its growth in value is not compensated by a proportional decrease of the insurance and con-sequent costs. Between the insurance and the consequent cost only the first can be actually decreased; in fact the consequent cost of an accident are directly related to medical care to the injured, to the repair or replacement of equipment and to the loss of productivity, all factors directly related to the accident.

In order to make possible further increase of the prevention cost, the insurance cost should be lowered. If the bonusmalus mechanism, on which is based the actual calculation of annual compulsory insurance premium paid to Inail (the Italian national occupational safety institute) by Italian companies, is revised with a rise of the maximum premium reduction a double effect will be reached: an increase of the prevention investments and, consequently, a reduction of consequent cost.

The increase of the maxi-mum premium reduction should be higher for SMEs both because this company size presents the more un-convenient payback time of safety investments and because the SMEs present the higher accident rate and greater severity.

1. Fundamentals of the methodology

The introduction of an OHSMS represents an effective discontinuity with the past, but it could be adopted with different levels of efficacy. OHSMS adoption and effective implementation by the employer determine a responsibility- exempting efficacy for the employer in the case of an unpredictable accident. The effective implementation should not be an on-off value, but it should assume different values on a scale that will be calculated by a specific index, called the Efficacy Index (EI). By Equation 1

$$EI \text{ (Efficacy index)} = B / (A + B) \quad (1)$$

Where

A = consequent costs related to accident, incident, near miss and professional disease

B = prevention costs to prevent and protect from accident, incident, near miss and professional disease. More in detail, it is possible to calculate A costs by means of Equation 2

$$A = A1 + A2 + A3 + A4 \quad (2)$$

Where

A1 = costs directly related to accident, incident, near miss

A2 = insurance costs and their variation;

A3 = complementary insurance costs; and

A4 = indirect costs for accident, incident, near miss management.

Identification and separated computation of OHS costs into direct and un-direct costs is not a novel approach and has been applied before to find the Safety Investments with the lower cost/benefits rate

The A1 costs, in turn, splits up in three contributions.

Equation 3

$$A1 = A1.1 + A1.2 + A1.3 \quad (3)$$

Where

[A1.1] are the costs due to “near misses”;

[A1.2] are the costs due to “accidents without injury”

[A1.3] are the costs due to “accidents”

B cost is not an annual cost as a costs are; it is a cumulative cost that needs to be actualized according to devaluation and real investment efficacy.

Shows the behaviour of the Efficacy Index according to the ratio between B and A costs. The Efficacy Index changes between 0 and 1. In fact, if A costs are 0, then $EI = 1$, while if B costs are 0, then $EI = 0$. A higher value of Efficacy Index means good efficacy of investments and vice versa. If we examine, for example, we find that consequent costs are equal to prevention ones and the Efficacy Index assumes a value of 0.5.

In a real enterprise, if no safety problems have occurred, the proposed index could be high even when only a few investments in safety were made. In these cases, the information given by the index may be misleading. For these reasons, the index should be used in order to establish the achievement of the minimum level of efficacy only when a minimum amount of specific investment in prevention is made by the enterprises. The threshold values will be calculated from the national averages reported for the various sectors and company sizes.

The calculation of the E.I. index in the first applications of the methodology can be a critical point, because of the lack of organized and structured information about safety investments made in each enterprise over the years.

2. Application Methodology

In order to understand the applicability and the behavior of the EI in SMEs in the Emilia Romagna Region, the research project named “Adoption and application of management models for health and safety at work and cost/benefits analysis” applied the EI model in a number of enterprises in the region in 2014.

The research project should initially have involved twenty-five enterprises. This enterprises were chosen because, having joined to a previous research project about OHSMS, they present a historical.

$$\text{Specific [A]} = [A]/n \quad (4)$$

$$\text{Specific [B]} = [B]/n \quad (5)$$

N = Total number of Employee

3. Information to be collected regarding (A1.1),(A1.2),(A1.3)

- Number of events
- Value €/h-man
- Costs for repairs/improvements
- Costs to update risk assessment and manage any reporting
- Estimated cost to remedy the damage caused to customers
- Costs of collateral services
- Specific Inail/Ausl costs Additional cost due to increased Inail premium caused by the accident
- Legal fees/administrative penalties
- Cost due to replacement of the injured person
- [A2] Insurance costs and variations Inail insurance premium paid in 2013
- [A3] Complementary insurance costs Insurance premium paid in 2013
- [A4] Indirect costs for accident, incident, and near miss management
- [B] Operating costs for safety. These are the costs incurred by the company to prevent and protect workers from occupational accidents and diseases
- Charges for external Supervisor for the Prevention and Protection Service (SPPS) and risk assessment activities (including any consultants)
- Charges for works physician and health surveillance
- Cost of meetings and of training/safety training sessions
- Charges for inspections, maintenance and refurbishment of safety devices
- Expenditure for the adoption of prevention and protection measures: PPE purchase, design and implementation of new interventions, retrofit of equipment and premises
- Additional costs due to use of OHSMS Charges for administrative support for active.

V. RESULT AND SIMULATION

Analyzing the individual cost items according to time, the prevention cost is expected to progressively increase its relative incidence compared to the others, but its growth in value is not compensated by a proportional decrease of the insurance and consequent costs. Between the insurance and the consequent cost only the first can be actually decreased; in fact the consequent cost of an accident are directly related to medical care to the injured, to the repair or replacement of equipment and to the loss of productivity, all factors directly related to the accident. In order to make possible further increase of the prevention cost, the insurance cost should be lowered. If the bonus/malus mechanism, on which is based the actual calculation of annual compulsory insurance premium paid to Inail (the Italian national occupational safety institute) by

Italian companies, is revised with a rise of the maximum premium reduction a double effect will be reached: an increase of the prevention investments and, consequently, a reduction of consequent cost. The increase of the maximum premium reduction should be higher for SMEs both because this company size presents the more un-convenient payback time of safety investments and because the SMEs present the higher accident rate and greater severity.

Table 1. Company list

Company List	Specific(A)	Specific(B)	Efficacy Index(E _i)	Safety Condition
Company(1)	High	Low	Low	Bad
Company(2)	Low	High	High	Good
Company(3)	Low	Low	Moderate	Un Predictable (Good)Or(Bad)

VI. CONCLUSION

This paper showed, how prevention investments seem to be positive for the health and safety of workers. Many studies show that the current incentive policy is appropriate only for big enterprises. so introduced efficacy index to measure the OHSMS. The research project was focused especially on small and medium companies because this size of business both presents the higher occupational safety problems and presents the higher number of employees. The correct allocation of budget for improving safety management system in small and medium scale industries used by applying efficacy index (EI). This is used to track the allocation and usage of fund for the identified hazard and to prevent misuse of safety budget by the companies. Budget allocated should serve the purpose and it is found that whether the budget is correctly allocated or over/under allocated.

The research project consisted of four steps:

- Development of a questionnaire easily presentable to the companies in order to calculate their EI.
- Presentation of the questionnaire to the companies and information gathering.
- Index calculation.
- Results analysis.

The EI calculation should be carried out every year, in order to understand the safety investments trend in the enterprises.

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