International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 01, 2020
ISSN: 1475-7192

Good Practices in Occupational Health and Safety: A Case Study on Productive Sector Ecuador

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Abstract--- *Good practices in occupational health and safety focus on determining optimal tasks to guarantee accident prevention. The intention of the research was to detect the management carried out in Ecuador, in terms of occupational safety and health to establish strategies that allow improvement to the process. The study was presented with a documentary design. The ergonomic methods applied are Reba and Rula, which should allow exemplifying the situation in the jobs with greater accident rate. Regarding the definition of strategies, this was executed with a matrix of internal and external factors, obtaining interesting and feasible results, such as the use of technology to perform physical and risk dysergonomic assessments in the workplace, it is proposed the planning of training that lead to the application of good practices in occupational health and safety, as well as the evaluation of the strategies proposed in short and medium periods in order to determine possible deviations and continue with the process of continuous improvement within the subject.*

Keywords--- *Good Practices, Health, Reba, Rula, Safety.*

I. INTRODUCTION

Safety at work has been fundamental for the productive development of companies because it is the one that provides the worker with the right conditions when carrying out their work activities (Moreno, 2011; Arnawa *et al.*, 2019), expresses that safety at work is a discipline whose objective is the application of measures and the development of the activities necessary for the prevention of risks arising from work. On the other hand, González Muñiz, (2003), expresses that work safety is the theoretical-practical discipline that uses a set of techniques and procedures that aims to eliminate or reduce the risk of accidents at work.

The World Health Organization (WHO, 2017), expressed that health should be based as a human right and not simply focused on disease. Therefore, in addition to establishing strategies conducive to achieving their goals, companies must also seek to maintain adequate working conditions and environments that ensure the safety and health of the worker. In addition to maintaining equipment, machinery and tools depending on the activities carried out; as well as the established procedures(Jhansirani, 2018; Larantika *et al.*, 2017; Loor *et al.*, 2019).

With regard to good practices in occupational safety and health, it is something that should be considered by all business management because it allows minimizing incidents and accidents at work. Bermúdez Benítez, (2018) points out that a good practice is an experience or intervention that has been implemented with positive results, being effective and useful in a specific context, contributing to the coping, regulation, improvement or solution of problems and/or difficulties that are present in the daily work of people in different fields. Morgan Torres (2018),

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DOI: 10.37200/IJPR/V24I1/PR200270
Received: 22 Nov 2019 | Revised: 26 Dec 2019 | Accepted: 10 Jan 2020

has stated that good practices refer to any experience that is guided by suitable characteristics or objectives and appropriate procedures or prototypes that fit a particular need, as well as any experience that has caused positive results in the risk prevention demonstrating its validity and usefulness in a specific context.

Morgan Torres (2018), expresses that good practices are used in different contexts to represent recommended ways of doing an activity which can serve as models for other organizations. Likewise, it indicates that the promotion of good practices in occupational safety and health is directly related to the current approaches on the criteria of technical relevance and efficiency of interventions, which cover not only the management system but mainly satisfaction of the needs of organizations in accordance with the identification, assessment of hazards and controls that are implemented against risks(Setyaningrum *et al.,* 2018; Suardana et al., 2018; Supinganto *et al.,* 2017).

Implementing good practices contributes to the improvement of the conditions and factors that can affect the well-being of all people (Patlán, 2016), who are within the facilities of a company, being evident then to apply good practices in safety management and health is a challenge that every company must assume because it contributes to the quality of life of the worker, as well as to the quality of business management.

For the year 2018, the Ecuadorian Accreditation Service states that Safety and Health at Work will increase global coherence by the new international standard ISO 45001: 2018, making workplaces safer and healthier. On the other hand, the Ministry of Labor of Ecuador, (2018) published a report based on the I Forum of Good Practices in Prevention and with it indicated that the Minister of Labor stated that there is a significant advance in the generation of a safety culture and occupational health, which will greatly benefit the work environment for the development of workers' activities.

Studies carried out by Moreira Macías (2019) revealed that for the year 2014 the accident reports represented an incidence of 623.07 cases per 100,000 workers, an index higher than the one registered in 2015, with 360.38. In addition, they determined that the incidence of occupational accidents resulting in a temporary disability in 2014 is 597.82 and 340.62 for 2015 per 100,000 workers.

It should be added that the IESS General Occupational Risk Insurance (2018), expressed that there has been an increase in occupational accidents in the last five years. In addition to this, it is indicated that the economic activities with the highest number of qualified work accidents from 2013 to 2018 have been the Manufacturing Industries with 25.7% and the Community, Social and Personal Service with approximately 22.9%.

After the above considerations, it is appropriate to mention that according to IESS statistics, the highest number of accidents occurs in the centers or usual workplace at 62.36%. Or even in other spaces within the company, as is the case when the worker moves from one place to another where 7.98% of accidents are evidenced, combined with 6.6% when he is in a different workplace.

In this sense, Zumba (2018), states that in Ecuador of not preventing and controlling occupational risks, approximate expenses of 4,000 million dollars per year would be generated, a cost that not only the State assumes, but the companies themselves. In addition to this, he points out that there are other risk factors that are impacting

DOI: 10.37200/IJPR/V24I1/PR200270
Received: 22 Nov 2019 | Revised: 26 Dec 2019 | Accepted: 10 Jan 2020

management, called ergonomic risks (related to physical postures) and psychosocial risks (which affect his stability and mood) to which much attention should also be given.

Consequently, the Occupational Health and Safety management must be seen with greater attention in order to create and implement actions conducive to Good Practices that allow maintaining or raising the Quality of Life of the worker and therefore maintaining the indicators aligned to Government standards, therefore, the purpose of the research was to establish actions aimed at Good Practices in occupational safety and health(Purnomo *et al.,* 2019; Puryana & Antarini, 2018; Rahmad *et al.,* 2019).

Finally, an awareness call is made to go beyond the simple creation of manuals or just meet requirements. At present, just as technology has incorporated new changes, new regulations and/or guidelines have been developed towards the improvement of management, such as the case of standards focused on Occupational Health and Safety.

II. Materials And Methods

The study is carried out in the first instance in an explanatory way to assimilate and obtain all the necessary information to systematically describe the study carried out (Arias F., 2012; Dami *et al.*, 2019; Delgado *et al.,* 2020; Dewi & Mustika, 2018), I plan that a descriptive investigation consisting of the characterization of a fact, phenomenon, individual or group, in order to establish its structure or behavior. In this sense, the information provided by the Occupational Health and Safety Institute in Ecuador was extracted, in the periods 2013 to 2018, comparing the accident rates and everything related to them.

Regarding the design of the research, documentary research was applied because it is a process based on the search, recovery, analysis, criticism and interpretation of secondary data, that is, those obtained and registered by other researchers in documentary sources: printed, audiovisual or electronic, that is what he said (Lopez *et al.,* 2019; Mero & Martinez, 2019; Pinto *et al.,* 2017; Arias F., 2012).The research was carried out by various authors on good Occupational Health and Safety practices, newsletters provided by the IESS and information on its web portal, which allowed the application of tools of analysis for the definition of strategies.

The analysis tools applied were ergonomic analysis and matrix of internal and external factors. The ergonomic analysis methods applied are the Rula and Reba, they assess the positions and postural loads, to be able to apply them, the steps indicated by (McAtamney & Corlett, 2004; Díaz & Torres, 2019; Ekawati *et al.,* 2017; Indradewi, 2020) were followed, which are: observe the task; determine the division of tasks, as well as the sides (right or left) to evaluate of the person; determine the scores of the positions and finally, define the existence of risk to establish the level of action. Based on the above, a matrix of internal and external factors was processed, initiating a process of investigation of variables, and determining strategies for the possible improvement of management in Good Practices.

III. Analysis And Discussion Of The Results

In order to establish strong actions to good practices in safety and health at work, which allow maintaining or raising the worker's life, the analysis of the results of different studies and surveys related to the published topics is presented in recent years.

DOI: 10.37200/IJPR/V24I1/PR200270
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Starting with the aforementioned actions, it is necessary to describe the current situation regarding good practices in occupational health and safety that exist in Ecuador. Therefore, the trend of the notices of accidents of skilled workers that have been notified from 2013 to 2017 is shown. figure 1 shows the graph of accidents in the period (2013-2017).

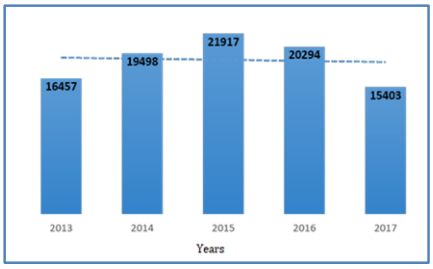

Figure 1: Accidents of qualified work period (2013-2017)

Source: General Insurance of Occupational Risks IESS, (2018)

There is an exponential growth of qualified work accidents between 2013 and 2015, a situation that tends to decrease in 2016 and 2017. It could be inferred that companies are carrying out improvement actions that counteract the figures that were being presented. According to the above, the economic activities with the highest incidence in Ecuador in the periods from 2013 to 2017 are detailed, in Table 1.

Table 1: Economic activities with the highest percentage of occupational accidents recorded from 2013 to 2017

Year	Economic activity	%
2013	Manufacturing industries	22.1
2014	Community, Social and Personal	23.7
2015	Service Community, Social and Personal	21.5
2016	Service Community, Social and Personal	23.7
2017	Service Community, Social and Personal Service	22.7

Source: General Occupational Risk Insurance IESS, (2018)

Table 1 shows the Community, Social, and Personal Service as the economic activity with the highest percentage of occupational accidents, for the years 2014 to 2017. Regarding manufacturing industries, the year that presented the highest index was 2013, however, For the following years, I occupy the activity with the highest index according to the data provided by the IESS. Following the same order, the different accidents registered by economic activity for the most recent period (2017) are characterized, which is shown in Table 2.

Table 2: Accidents classified by economic activity period 2017

Activity	Percentage (%)
Social services , communal and personal	**22.00**
Manufacturing industries	20.30
Wholesale and retail trade restaurants and hotels	16.10
Agriculture, hunting, forestry, and fishing	13.90
Financial establishments, insurance, business services	10.70
Transport storage and communications	5.40
Construction	4.20
Electricity gas and water	2.80
Undefined	2.20
Mining and quarrying	1.70

Source: (IESS General Occupational Hazards Insurance, 2018)

DOI: 10.37200/IJPR/V24I1/PR200270
Received: 22 Nov 2019 | Revised: 26 Dec 2019 | Accepted: 10 Jan 2020

In Table 2, it is evident that the manufacturing industries have a very high index, even close to that of social, communal and personal services. Both economic activities show values close to an average of twenty percent of the accident rate (20%). However, wholesale and retail trade, agriculture, hunting, forestry and fishing, and financial establishments result in average rates of fourteen percent of accident rate (14%). However, the sectors with the highest safety and health regulations are referred to as construction, mining and water, gas and electricity, and have lower rates.

It is obvious, to draw the conclusion that regardless of the degree of impact that the accident may cause to workers, the environment or heritage, there must always be entities that exercise the correct performance of the activities, without taking into account, if the business administrators are public or private origin. This is clearly shown by the economic activity of greater accident rate, being of public administration in most cases(Albán *et al.*, 2019; Astra & Artanayasa, 2017; Cevallos *et al.*, 2019).

In addition to this, it is common to observe that the items that generate accidents with greater possibility of fatality or disability (construction, mines, electricity, others), are inspected more frequently and with more standards, which despite being necessary, should not repress to other activities, because the accident rate must be mitigated or reduced in its entirety, regardless of the type of accident. Continuing with the study, the elements involved in the accidents are evaluated, they can be seen in Figure 2.

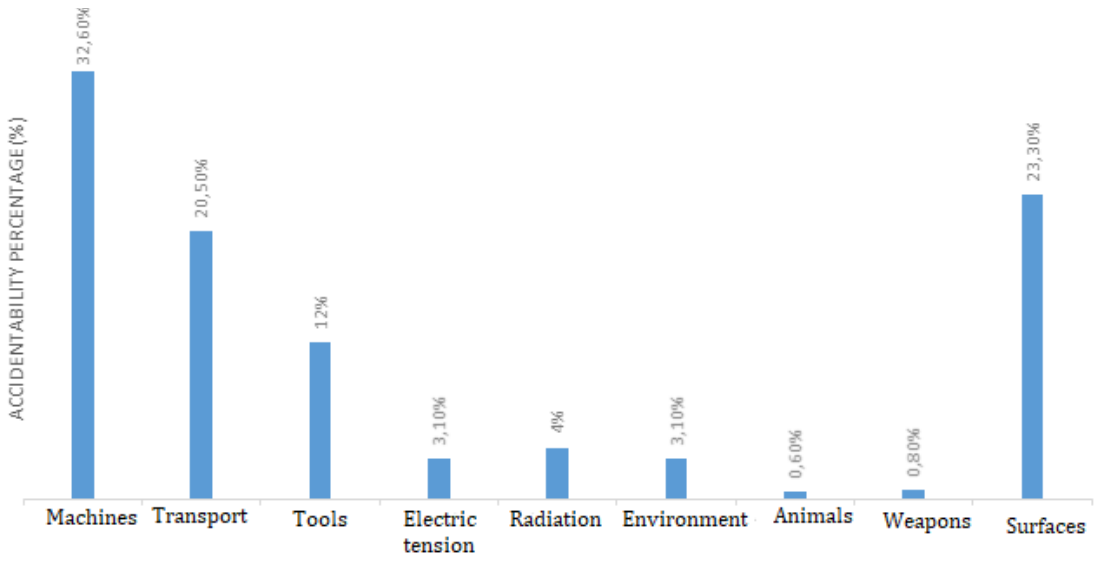

Figure 2: Percentage of accidents per element

Source: General Work Risk Insurance IESS, (2018)

It can be seen that the greatest incidents occur where the worker participates directly with the activity, in the case of machinery and transportation. It could be inferred that workers are not making use of work practices properly, as well as the norms that affect them. It is also observed that 23.30% of the work surfaces have high percentages deducing that the signs in the workspaces present difficulties, as well as the environmental conditions. Recognized the elements with the highest percentage of accidents, the conditions that suck the highest percentage of accidents were determined in Table 3.

DOI: 10.37200/IJPR/V24I1/PR200270
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Table 3: Percentage of accidents according to working conditions

Conditions	Percentage (%)
Protection and non-existent or inadequate safeguards	17.90
Insufficient warning system	10.10
Limited space to operate	9.00
Defective machines, equipment, tools or materials	7.20
Protective equipment individual nonexistent or not adequate	6.00
Abnormal pressures	2.90
Non-ergonomic conditions	2.70

Source: IESS General Occupational Hazards Insurance, (2018)

It is observed in table 3, that the protection and backup and the warning system are the conditions with the greatest accident rate projecting an average of fifteen percent (15%) and the others are summarized in ergonomic and psychosocial conditions, being able to confirm the aforementioned that there are industries, which have a regulation in the field of occupational safety and health, it is necessary to deepen, to Determine an action plan.

In addition to indicating the conditions with the highest incidence in occupational accidents, it is advisable to show the percentages of accidents due to worker actions in the period of time mentioned in Table 4.

Table 4: Percentage of accidents due to worker Employee

Actions	Percentage (%)
Failure to point out or warn of danger	42.60
Failure to adequately insure	11.50
Lack of coordination in joint operations	5.10
Adopt an inappropriate position to do the task	4.80
Inappropriate use or failure to use protective equipment	2.70
Decommission or eliminate safety devices	2.50
Use equipment and / or tools incorrectly	2.30
Operate equipment without authorization	1.90
Use defective or improper equipment	1.80
Perform equipment maintenance while operating	1.70
Handle loads incorrectly	1.40
Operate at an inappropriate speed, equipment, machines, other	0.80
Place the load of man was incorrect	0.40
Raise equipment incorrectly	0.20

Source: General Occupational Risk Insurance IESS, (2018)

In Table 4, it is inferred that in most industries, personnel need awareness in the field of safety and health, said reference, part of 42.60% of accidents that originate from a failure to address or warn of the danger. It should be noted that the responsibility for this index does not lie solely with the worker, but is also shared with the supervisory staff and in some cases in the policies used by the industry. Companies must apply different information methods in

DOI: 10.37200/IJPR/V24I1/PR200270
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occupational health and safety (safety talks, analysis of safe work, training in good practices towards the activities carried out, others). Methods that must be filed and documented at the administrative level as evidence that they are being carried out.

Now, these methods not only reduce or mitigate the possibility of the accident, they also decrease the other accidents presented in table 4. If there is knowledge of safety and health in each person, they will apply good practices when carrying out their work, actions such as not assuring properly, coordination of joint operations, adoption of bad positions, misuse of personal protective equipment, among others, will affect their accident rates positively and directly(Suwitri & Sidiartha, 2018; Wiardani *et al.,* 2018).

In accordance with the study, it is necessary to present the most recent data, showing in table 5, a summary of notices of work accidents and occupational diseases in the first four bimesters of the year 2018.

Table 5: Summary of notices of work accidents and occupational diseases

Bimester	Registered cases	Work-related accidents (%)	Occupational diseases (%)	Variation of cases with respect to the previous two-month period (%)
Jan-Feb	3539	96.5%	3.5%	-
Mar-April	3740	96.1%	3.9%	7.20%
May-Jun	4163	95.0%	5.0%	11.50%
Jul-August	4117	96.0%	4.0%	-1.10%

Source: General Occupational Risk Insurance, (2018)

Table 5 shows that for the year 2018 occupational health and safety in Ecuador It is in decline, due to the increase in cases from bimonthly to bimonthly, and although, there is a decrease from July to August with respect only to the previous two-month period, it is excluded for not counteracting the previous results. On the other hand, it is necessary to note that occupational diseases have an alarming percentage, these must be null or almost nil, not only because of the costs they have for companies but also because they influence the quality of life of the worker; a situation that affects both your home and society. It is essential to analyze the issue in-depth and generate strategies.

Next, Table 6 shows the economic activities with the highest number of accidents of qualified jobs registered in 2018 during the two-month periods of January-February, March-April, May-June, as well as the average of the percentages obtained for each activity.

Table 6: Summary of accidents classified by economic activity (two months 2018)

Economic activity	Jan-Feb (%)	Mar-April (%)	Jun-Jul (%)	Agos-Sep (%)	Average (%)
Social, communal and personal services	24.10	24.90	24.40	23.60	24.25
Manufacturing industries	18.90	19.20	19.30	19.90	19.33
Wholesale and retail trade restaurants and hotels	18	15.70	15.40	15.70	16.20
Agriculture, hunting, forestry and fishing	13	14.10	12.80	14.80	13.68
Financial establishments, insurance, business services	11.50	10.20	10.60	11.20	10.88
Transportation, storage and communications	5.80	4.80	6.20	5.50	5.58
Construction	2.80	3.90	4.40	4.00	3.78
Undefined	2.50	3.00	3.30	2.40	2.80
Electricity, gas and water	2.30	2.30	2. 60%	2.10	2.33
Exploitation of mines and quarries	1.10	1.90	1.00%	0.80	1.20

Source: General Work Risk Insurance IESS, (2018)

DOI: 10.37200/IJPR/V24I1/PR200270
Received: 22 Nov 2019 | Revised: 26 Dec 2019 | Accepted: 10 Jan 2020

It is noted in table 6, which for the period of 2018, occupational health and safety continues with the trend of previous years, maintaining social services and manufacturing, with the average of twenty percent (20%) of the accident rate. The result is critical because it not only influences the costs and health of the worker, it also influences the effectiveness of business management.

Based on the above, in order to establish strategies for the description presented, an analysis is made of the internal factors that are affecting the good practices in occupational health and safety of Ecuador observed in Table 7.

Table 7: Analysis of internal factors

Strengths	Weaknesses
Possibility of economic capital	Administration and extensive bureaucracy
There are regulatory entities that ensure occupational Health and Safety and good practices	There is no administration that guarantees that entities carry out their work throughout the industrial sector
Qualified Personnel	Lack of incentives and motivation
Updated records of companies throughout the national territory	Constant evaluation only in transformation, exploitation and / or construction companies
Team of people from each company made up of the same workers, who oversee and supervise good practices in Occupational Health and Safety	Control only of some of the reports delivered

It is shown in Table 7, that each of the characteristics of the Occupational Health and Safety Sector, synthesizes the information to start generating strategies. However, it is necessary to analyze the external factors involved, which are presented in Table 8.

Table 8: Analysis of external factors

Opportunities	Threats
International data in Good Occupational Health and Safety Practices	High bureaucracy for budget approval
Technology that facilitates the Evaluation of jobs	Resistance to change by staff
Companies specialized in Good Occupational Health and Safety Practices	Public administration entity, therefore, constant management change
Possibility of implementing or improving national regulations High number	of companies throughout the national territory

Analyzing The above and with the intention of having actions focused on good practices in an integral way, the evaluation of ergonomic risks of an administrative office is presented, shown in Table 9.

Table 9: Evaluation of dysergonomic risks

Activity	Posture	REBA	RULA	Body Segments involved
Administrative assistant Ecuador		Score Evaluation	Score Evaluation	Back Cervical Wrist
		5	5	
		Level of Action	Level of action Action	
		Is required	Rapid changes in the design of the task and / or the job position	Comments
				are required Corrections in back and neck tilt are required, as well as a wrist support

Table 9, shows a worker in the position of administrative assistant, a position corresponding to the branch of social, communal and personal services, which is the economic activity with greater accident rate according to this study, have using the REBA and RULA methods to determine the *dysergonomic* risks, it can be seen that both yielded an emergency result that is, a redesign of the task and/or the job is required, in the image it is determined

DOI: 10.37200/IJPR/V24I1/PR200270
Received: 22 Nov 2019 | Revised: 26 Dec 2019 | Accepted: 10 Jan 2020

that the worker has an inadequate work posture, which is a static activity tends to be maintained for a long time In this position, increasing the possibility of occupational diseases, in this case there is a risk of herniated discs, cervical rectitude, and carpal tunnel.

Continuing evaluation of no ergonomics risks in table 10 otherwise shows:

Table 10: Evaluation of no ergonomics risks

Activity	Posture	REBA	RULA	Segments Body committed
Seamstress		rating rating	rating rating	Back Cervical
			April 5th	
		Action Level	Level action	
		Is the required performance	Action level Changes in the design of the task may be required	Observations It is necessary to correct the posture of the back and neck

You can see in Table 10 that a worker in the sewing position, which belongs to the economic activity of manufactures, the second economic sector with a higher rate of occupational accidents, the REBA and RULA methods were used for risk assessment, concatenating the results produced by both methods evidencing the need for a redesign of the task, it is observed that the lady has her back bent, It is assumed as a product of the visual effort you must make, bringing your body in this way to the fabrics you are working on, on the other hand, your neck is tilted forward, increasing the risk of cervical rectitude, as well as herniated discs.

Once the situation has been described and analyzed, the results are presented in the form of strategies.

- Establishing strategic alliances with the private sectors in such a way that in addition to allowing growth over time, they lead to take appropriate actions so that political and economic social changes in the country do not directly affect management
- It is advisable to perform internal audits and apply the actions in a timely manner according to the priorities and/or goals of the management.
- Establish alliances with human talent that contribute to their participation in the development of management, as well as their personal growth and motivation.
- Establish schedules that include the training and/or training of human talent focused on the actions of Good Practices that are directed to the job where they work.
- Plan the semi-annual rotation of the staff with the intention that they feel identified with the mission and vision of the companies, as well as their motivation.
- Establish incentive and identity campaigns that are in favor of productivity and compliance with good labor practices.
- Regularize the control of good practices towards all industries regardless of the economic sector that belongs, in periods of three months, so that corrective actions can be taken as to the deviations that may occur in the different sectors.

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- Incorporate technological tools in a period of no more than three months that facilitate the evaluation of both physical and *dysergonomic* risks in the different jobs, with emphasis on the sectors with greater accident rate.

Having presented the strategies for the improvement of Management of Good Practices in Occupational Health and Safety in Ecuador, it is advisable to evaluate for a time not exceeding three years, the new indexes in Occupational Health and Safety, and determine if the strategies applied were efficient in reducing or mitigate accident rate in Ecuador. As a final part of the article, it is considered necessary to carry out a process of continuous improvement in order to focus good practices for its subsequent application.

IV. CONCLUSION

Applying Good practices are systematic actions that will allow quality and effectiveness in their management, and Occupational Health and Safety, are measures and control of activities that prevent the risks inherent to the work, that is, Good Practices in Occupational Health and Safety, are to carry out the measurements and control of activities in an optimal way guaranteeing the maximum prevention of accidents.

It was pointed out that the main strategies to guarantee good practices are: The regulation and supervision carried out by specialized personnel involved in all the industries throughout the Ecuadorian national territory, regardless of economic activity or type of administration (public or private); the economic activities with greater accident rate are social, personal, communal services and the manufacturing industry with rates of 24% and 19% from 2013 to 2018; the number of accidents reported in Ecuador is averaged in 19,000 cases, an annual cost that directly impacts the economic stability of the country; the majority of accidents reported are due to not pointing out and / or warning of the danger, a fact that falls directly into the actions of the workers; Evaluate the possibility of a self-sustaining economic plan that allows regulatory entities to reduce dependence on public capital.

ACKNOWLEDGMENTS

We are grateful to two anonymous reviewers for their valuable comments on the earlier version of this paper.

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DOI: 10.37200/IJPR/V24I1/PR200270
Received: 22 Nov 2019 | Revised: 26 Dec 2019 | Accepted: 10 Jan 2020

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Received: 22 Nov 2019 | Revised: 26 Dec 2019 | Accepted: 10 Jan 2020