



## Ergonomic Risk Assessment for Forced Posture



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### Abstract

Applying the ergonomic method "rapid assessment of the whole body" (REBA), a way of evaluation and diagnosis of the jobs immersed within the direction of Human Talent of the Provincial Government of Manabí (GPM) is demonstrated. To the prevention of future diseases by studying techniques that can improve the health of the personnel involved. A diagnosis of the risk factors present in the workplace was carried out. The field evaluation was carried out and the descriptive procedure was applied by collecting data from a population in association with the following techniques: observation, survey, matrix, As a result, a rest break system should be implemented so that people can recover their energies in order to improve their work performance and that they develop training, talks, and workshops that help to improve knowledge about ergonomics and their risk factors.

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## 1. Introduction

Between the eighteenth and nineteenth centuries when the industrial revolution occurs, worldwide changes are beginning to emerge and new problems for entrepreneurs appear. These problems are of the organization, function, management, etc. The static environments are modified and with them the development and the person who works as a worker. These modifications are aimed at increasing productivity by making the most of the human effort without causing fatigue (Borghouts *et al.*, 1999).

As expressed in several books on the subject of German origin, especially those of the REBA methodology, ergonomics is the study part of the work that, using anatomical, physiological, psychological, sociological and

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technical knowledge, develops methods for the determination of The limits that must not be surpassed by man in the different labor activities (Cuixart, 2001).

Over the years, various researchers have recognized that a workspace where data visualization screens are used and that ergonomic criteria have not been considered in its design can generate short and medium term physical and emotional discomfort in the staff who occupy it, reducing the efficiency and labor productivity (Manuel Fidalgo Vega, 2001).

Musculoskeletal Disorder (MED): This is a physical injury caused by accumulated trauma, which develops gradually over a period of time as a result of repeated efforts on a specific part of the skeletal muscle system. It can also be developed by a punctual effort that surpasses the physiological resistance of the tissues that make up the skeletal muscle system (Paola Vernaza-Pinzón and Sierra-Torres, 2005).

Studies in Europe provide considerable evidence indicating that musculoskeletal disorders of the back, neck, and upper extremities are on the rise and are a costly and important health problem that gravitates to the conditions of society (Silvia Nogareda Cuixart, 2001).

Musculoskeletal disorders may become aggravated over time and therefore become more expensive compared to injuries resulting from an unexpected event. This also means that it may take a long time for the worker to return to his or her position, resulting in a greater loss of time.

The present evaluation is oriented in the reality that the workers of the GPM cross, having as evidence a way of evaluation and diagnosis of all the jobs immersed within this direction. This seeks to contribute to occupational health through the prevention of future occupational diseases, for this is intended to decrease in employees and workers the latent risks to which they are exposed and the factors that cause them. This is intended to raise the standard of living and compliance of employees in the progress of their work, increasing the performance of work. There are inadequate equipment and facilities and, mainly, the adoption of forced positions, one of the main causes of musculoskeletal disorders in employees and workers at the time of their work, which would make their health difficult over time, which Converges in the suffering of musculoskeletal diseases

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The objective of the research is to perform the estimation using the REBA method, one being the ergonomic methods where the observation is used for the evaluation of more widespread postures in practice, valid and easy to use.

## 2. Materials and Methods

Different approaches to research were put into practice, including methods of observation, video capture, survey application, and the REBA method. The basic method in the research was the descriptive one since this type of investigation implies to observe and to describe the behavior of a given population. In addition to evaluating certain characteristics of a particular situation, where the collected data are analyzed to discover which variables are related to each other and to be able to interpret the results. The materials that were used were a video camera, camera, initial identification matrix of risks and computer.

## 3. Results and Discussions

A field data collection was carried out in the Human Talent Directorate of the Manabí Provincial Government, making judgments of the situation through a systematic and rigorous process of analysis and presentation of results, reaching the experimentation in a scenario to determine Insufficiencies and difficulties in order to use knowledge for practical purposes.

Direct evaluations were made to the worker at his her workplace, being the most significant procedure in the evaluation, since it is required the continuous visualization of these, also of the collection obtained in the statistical data that are in the files of the medical dispensary of the Institution and by means of the interrogations made in the surveys.

The REBA method makes ergonomic evaluation especially sensitive to ergonomic risk factors by forced postures that lead to musculoskeletal disorders, divides the body into segments to be individually coded and evaluates both the upper limbs, neck, trunk, and the legs; As well as the interaction of these with their constant forced posture. Figure 1 shows an image of the neck position of one of the workers studied, as you can see their position is not correct.

**A**



**B**

**METHOD R.E.B.A. (Data sheet) :**  
**Group A: Analysis of neck, legs and trunk**  
**NECK**

Movement	Punctuation	Correction
0°- Flexion	1	Add +1 if there is Torsion or lateral tilt
>20° Flexion or Extension	2	



**2**

Figure 1. In (A) Inadequate position and (B) REBA results for neck position

As can be observed, the position of the worker is greater than 20o of flexion, which indicates a position of 2, different from the normal values that a worker must have, this test shows that he is subject to a given level of risk.

The behavior of the trunk position Figure 2 (A) was also studied, obtaining the results observed in Figure 2 (B).

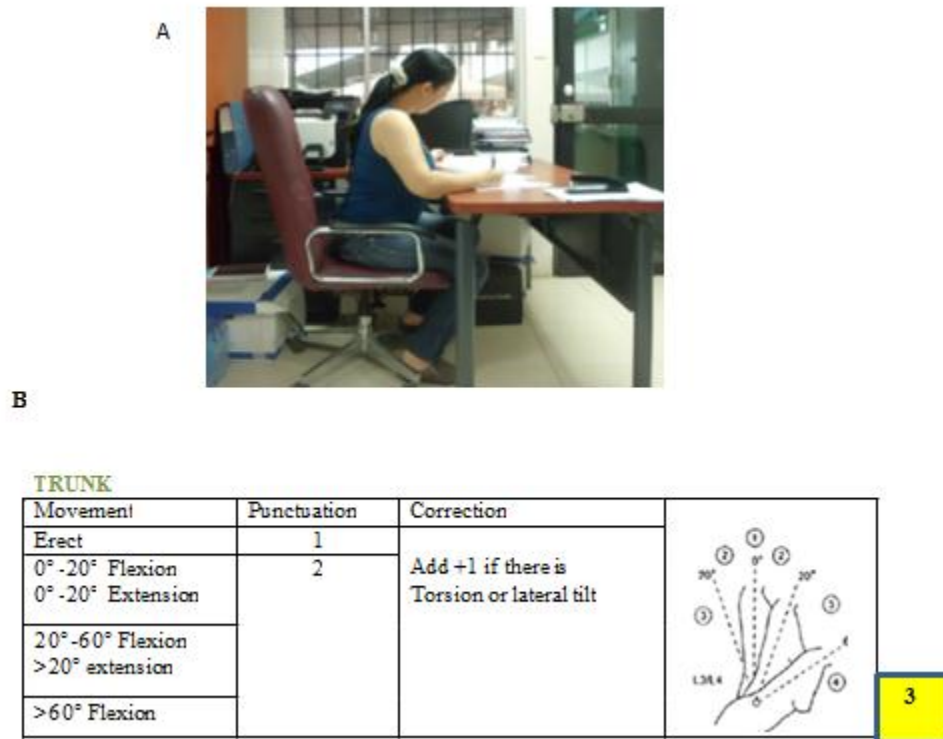


Figure 2. In (A) inadequate position, (B) results obtained

It can be observed that the position that has the collaborator is in the range of between 20o to 60o of flexion, indicating a score of 3, that is with a score of 1 to 5 within the normal values that must have a worker, The test shows that the worker is exposed to a given risk level.

In addition, the work rate is evaluated, which is given by the relation of the speed of work and the permanence of the task; The Effort, the result of the interaction of the effort appreciated by the evaluator and its frequency and self-assessment, in which the individual is consulted about his perception of the work he performs.

Figure 3 shows the results obtained in the evaluation of the position of the legs, in the case of the inadequate position.

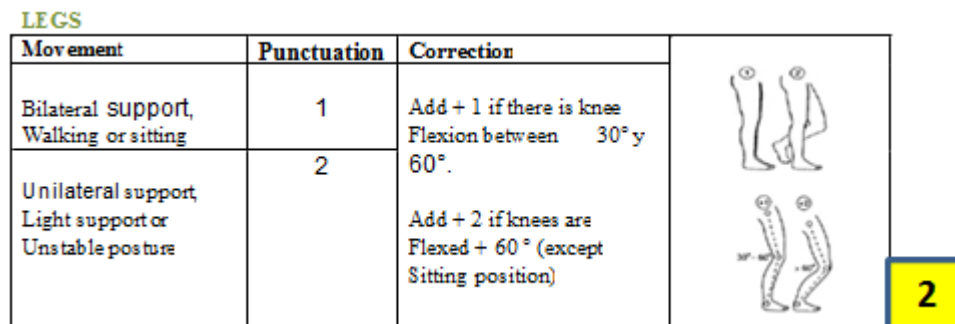


Figure 3. In the case of the legs improper position

It can be observed that the position of the legs has a score of 2 which indicated that they maintain periods of intense concentration in their workplace during their working day that is equivalent to an unstable posture.

With the application of this method, it is possible to monitor the results obtained in workers and their work environments so that they can be trained to improve these assessments and obtain adequate health, better performance in their work and greater satisfaction in the workday.

The application of the REBA method revealed that 62% of the workers are located at a medium risk level, 38% are at a low-risk level and no high and very high-risk factors were found.

#### 4. Conclusion

The most important causes of the risk factors that were identified in the work positions are a light inflection of the infrequent trunk and the neck that lingers in slight flexion in some rotated periods. This place of work has a regular regularity in something light, this movement existing a little stressful. It is necessary to clarify and make corrections if the case warrants it.

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##### *Statement of authorship*

The authors have a responsibility for the conception and design of the study. The authors have approved the final article.





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