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Industrial engineering applied to the Chair Law: ergonomic planning and resource sizing using the 5W+1H methodology in a bonded warehouse

Engenharia industrial aplicada à Lei da Cadeira: planejamento ergonômico e dimensionamento de recursos pela metodologia 5W+1H em um recinto alfandegado

Ingeniería industrial aplicada a la Ley Silla: planeación ergonómica y dimensionamiento de recursos mediante la metodología 5W+1H en un recinto fiscalizado

Abstract: For more than two centuries, work in production plants and warehouses has been performed standing, a condition that occupational ergonomics seeks to reverse by redesigning workstations. In Mexico, on December 19, 2024, an amendment to the Federal Labor Law known as the "Ley Silla" (Chair Law) was published, recognizing workers' right to a seated rest period during their shift. This article documents how a bonded warehouse —a facility under customs regime where personnel operate almost entirely in a standing position— prepared to comply with the amendment, applying the 5W+1H methodology to guide an implementation plan supported by statistical analysis, Mexican regulations (NOM-036-1-STPS-2018, 2025 STPS Provisions), and ergonomic studies. Standing-related risk was assessed in a sample of 18 workers, statistically projected to the 79 in the operating area (83.3% at medium or high risk); the number of seats required per area was calculated (16 in total, including the facility at the Mexico City International Airport); and six rest-schedule distribution scenarios were designed, along with an implementation guide. The work is limited to the planning phase; final scenario selection and execution remain as future work.

Keywords: Bonded warehouse. Ley Silla. 5W+1H methodology. Occupational ergonomics. Mexican regulatory framework.

Resumo: Há mais de dois séculos, o trabalho em plantas de produção e armazéns é realizado em pé, condição que a ergonomia do trabalho busca reverter por meio do redesenho dos postos de trabalho. No México, em 19 de dezembro de 2024, foi publicada a reforma da Lei Federal do Trabalho conhecida como "Lei da Cadeira", que reconhece o direito dos trabalhadores ao descanso sentado durante a jornada. Este artigo documenta o planejamento com o qual um recinto alfandegado — imóvel sob regime aduaneiro onde o pessoal trabalha quase integralmente em posição ortostática — se preparou para cumprir a reforma, aplicando a metodologia 5W+1H como guia de um plano de implementação sustentado em análise estatística, nas normas mexicanas aplicáveis (NOM-036-1-STPS-2018, Disposições STPS 2025) e em estudos ergonômicos. O risco por posição ortostática foi avaliado em uma amostra de 18 colaboradores, projetada estatisticamente para os 79 da área operacional (83,3% em risco médio ou alto); calculou-se o número de assentos necessários por área (16 no total, incluindo o recinto no AICM); e foram elaborados dois cenários de distribuição dos horários de descanso, além de uma instrução de implementação. O trabalho limita-se à fase de planejamento; a seleção final dos cenários e sua execução permanecem como trabalho futuro.

Palavras-chave: Recinto alfandegado. Lei da Cadeira. Metodologia 5W+1H. Ergonomia do trabalho. Normas mexicanas.

Resumen: Desde hace más de dos siglos, el trabajo en plantas de producción y almacenes se realiza de pie, condición que la ergonomía laboral busca revertir mediante el rediseño de los puestos de trabajo. En México, el 19 de diciembre de 2024 se publicó la reforma a la Ley Federal del Trabajo conocida como "Ley Silla", que reconoce el derecho de las personas trabajadoras a un descanso sentado durante su jornada. Este artículo documenta la planeación con la que un recinto fiscalizado —inmueble bajo régimen aduanero donde el personal opera

casi en su totalidad en bipedestación— se preparó para cumplir la reforma, aplicando la metodología 5W+1H como guía de un plan de implementación sustentado en análisis estadístico, en la normatividad mexicana aplicable (NOM-036-1-STPS-2018, Disposiciones STPS 2025) y en estudios ergonómicos. Se evaluó el riesgo por bipedestación en una muestra de 18 colaboradores, proyectada estadísticamente a los 79 del área operativa (83.3% en riesgo medio o alto), se calculó el número de asientos necesarios por área (16 en total, incluido el recinto en el AICM) y se diseñaron dos escenarios de distribución de horarios de descanso, además de un instructivo de implementación. El trabajo se limita a la fase de planeación; la selección final de los escenarios y su ejecución quedan como trabajo futuro.

Palabras clave: Recinto fiscalizado. Ley Silla. Metodología 5W+1H. Ergonomía laboral. Normatividad mexicana.

1. Introduction

A bonded facility is a privately owned property located within the jurisdiction of a customs office and authorized to receive goods under the strategic bonded facility customs regime. This regime allows foreign, domestic, or nationalized goods to enter for a limited period for handling, storage, safekeeping, display, sale, distribution, production, processing, repair, or courier shipment. The regime is operated by legal entities — bodies created and recognized by law to regulate and promote lawful activities — that have the right to use or enjoy an area within these authorized properties, or hold a concession or authorization to provide handling, storage, and safekeeping services for foreign trade goods.

In practice, operations within these facilities resemble those in any warehouse: operators, pallet truck operators, and forklift operators sort, position, and dispatch goods under an immediate supervisor and, above that level, management, all subject to regulation by Mexico's National Customs Agency (ANAM) and in compliance with the Customs Law. The operating area requires standing work, that is, an upright posture supported by both lower limbs; lifting and moving goods from one point to another adds to the high physical demands of these jobs. Standing may be static, when workers perform their tasks with minimal movement, or dynamic, when they can move more extensively; in either case, when maintained for more than three consecutive hours during a shift, it is considered prolonged standing, the condition addressed by the legal amendment. Along these lines, Juárez Ochoa et al. (2025) developed a methodological guide to assess standing workstations and align them with the Chair Law in a maquiladora company in Ciudad Juárez, noting that the lack of established ergonomic methodologies makes it difficult for organizations to respond promptly to this amendment. Work study and ergonomics form part of the traditional core of Industrial Engineering, a

discipline that analyzes and designs work methods with consideration for the human factor (NIEBEL; FREIVALDS, 2009).

On December 19, 2024, the amendment popularly known as the “Chair Law” was published in the Diario Oficial de la Federación (DOF) (CÁMARA DE DIPUTADOS, 2024). The name is somewhat misleading: it is not a new law but an amendment to Articles 132 (first paragraph and subsection V), 133 (first paragraph), 422 (first paragraph), and 423 (subsections I, V, VIII, and X) of the Federal Labor Law (LFT), together with the addition of subsection XVII Bis to Article 133. It guarantees the right to rest during the working day for people who work standing in service and trade sectors, comparable workplaces, and industrial establishments. The amendment entered into force on June 17, 2025, accompanied by the Official Provisions prepared by the Ministry of Labor and Social Welfare (STPS) and published in the DOF (DIARIO OFICIAL DE LA FEDERACIÓN, 2025). STPS is responsible for monitoring and enforcing them under Article 123, Section A, of the Political Constitution of the United Mexican States and its regulations. The same document suggests drawing on NOM-017-STPS-2024 (personal protective equipment), NOM-019-STPS-2011 (occupational safety and hygiene committees), and NOM-030-STPS-2009 (preventive occupational safety and health services) to better interpret the Provisions.

The STPS Official Provisions list what employers must do to comply with the amendment: conduct an analysis to identify personnel who need a seat or chair with a backrest, incorporating it into the occupational safety and health program under NOM-030-STPS-2009; record standing-related occupational risks and corresponding preventive measures in the safety and hygiene committee’s inspection reports; assess each standing worker’s risk level using seven factors, for which the document itself provides tables and a scoring procedure; provide the most suitable type of seat or chair based on the risk assessment, either at the workstation or elsewhere; implement preventive measures such as workstations that allow sitting, posture alternation, ergonomic footwear, cushioned flooring, and an active-break program; and inform workers about standing-related risks and the measures adopted to prevent them.

The challenge for the bonded facility is therefore one of translation: turning the legal text into a concrete plan that can be implemented on the operating floor. This article documents that planning phase as an Industrial Engineering problem involving work study, ergonomics, and process design, rather than a legal or administrative exercise. The objective was to plan implementation of the amendment in the bonded facility’s operating area so that it would be executable, using the 5W+1H methodology as a guide, supported by statistical analysis, applicable Mexican regulations, and ergonomic studies.

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2. Materials and methods

Planning relied on the 5W+1H methodology, also known as the Kipling Method in honor of Rudyard Kipling. It consists of asking a fixed set of questions about a problem to improve a process or plan and implement something new as a solution (Table 1). Its strength lies in requiring a precise definition of what, when, where, who, why, and how each action will be carried out, making it a widely used tool alongside the PDCA continuous improvement cycle in process management (TRÍAS et al., 2009).

Question	**Meaning**
What?	What?
When?	When?
Where?	Where?
Who?	Who?
Why?	Why?
How?	How?

Table 1. 5W+1H methodology.
Source: prepared by the author based on Trías et al. (2009).

The methodology was developed as follows:

What? The objective was to plan the Chair Law amendment so that its implementation in the bonded facility's operating area — that is, the warehouse — would be straightforward.

When? The deadline began on June 17, 2025: from that date, organizations have 180 calendar days to adjust their internal rules, regulations, and working conditions.

Where? The adjustments were made in the bonded facility's operating area, where standing work is most prevalent: Warehouse, Arrivals (parcels), and the Pre-inspection Area.

Who? Engineering and Legal handled planning, monitoring, and compliance in implementing the amendment.

Why? Beyond the benefit to standing workers, the reason is to meet STPS legal requirements and avoid fines and penalties: noncompliance can cost thousands of times the value of the Unit of Measurement and Updating (UMA) and, in the event of repeated violations, escalate to suspension of operations.

How? The preceding five questions led to five procedures, described in sections 2.1 to 2.5: (1) drafting an internal policy; (2) designing and conducting an ergonomic study with its risk matrix; (3) calculating the number of seats per area; (4) designing rest-schedule distribution scenarios; and (5) preparing a work instruction with its communication materials.

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2.1 Chair Law policy

The “Chair Law Policy” was drafted as an internal document through which the Organization informs its personnel of its alignment with regulatory compliance and protection of their rights and obligations as employees. The policy addresses all operating-area personnel who work standing; it formalizes the company’s commitment to Articles 132 (first paragraph and subsection V), 133 (first paragraph), 422 (first paragraph), and 423 (subsections I, V, VIII, and X) of the LFT, plus subsection XVII Bis of Article 133. It covers scope, responsible parties, references to the amendment and the STPS Provisions, and the instruments on which it relies (risk matrix, work instruction, etc.). For confidentiality reasons, the document is not reproduced in this article; together with the instruments derived from it, it forms part of the Integrated Management System (SGI) that the Organization is in the process of developing.

2.2 Ergonomic study and risk matrix

Once the policy had been defined, the next step was to design the procedure for measuring the risk level of standing workers. The diagnosis relied on two official documents: the Provisions on occupational risk factors published by STPS in the DOF on July 17, 2025, and NOM-036-1-STPS-2018 on ergonomic risk factors at work, which specifies how to identify, analyze, prevent, and control them (SECRETARÍA DEL TRABAJO Y PREVISIÓN SOCIAL, 2018).

The Provisions require each standing worker to be assessed using seven factors: a) time spent standing; b) ability to change posture; c) type of work surface; d) characteristics of the footwear used; e) space available for movement; f) discomfort reported by the worker; and g) breaks or alternative tasks without compromising the activity. To operationalize this assessment, the diagram in Figure 1 was designed to determine whether the Decree applies to the person and, if so, where the seat or chair with a backrest should be provided.

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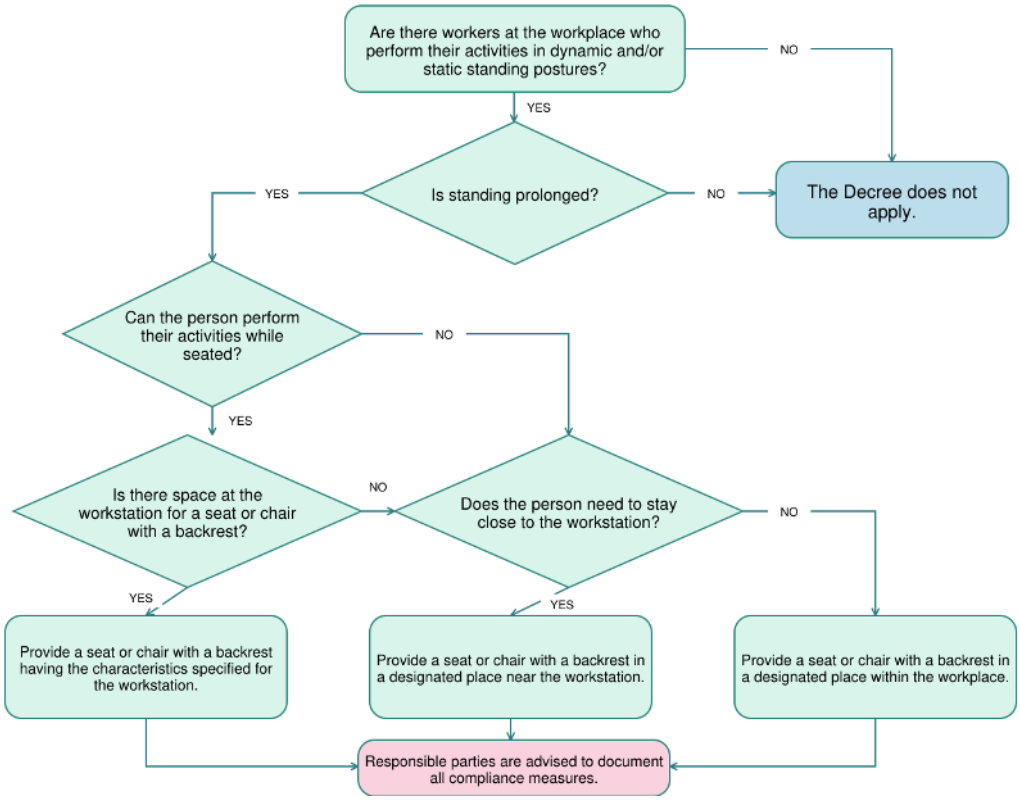

Figure 1. Support diagram for determining the need for and location of a seat or chair with a backrest.
Source: STPS Official Provisions.

To bring the assessment onto the operating floor, a mobility questionnaire was designed for operating personnel (Figure 2), in which each of the seven factors is rated at three levels — Low, Medium, and High — equivalent to the score of 1 to 3 established by the regulations.

Mobility questionnaire
Date: _____ Area: _____ Position: _____
Mark the applicable option with an X.

Question	**Rating 1**	**Rating 2**	**Rating 3**
1. Continuous time standing	Low (0 to 30 minutes)	Medium (30 to 60 minutes)	High (more than 60 minutes)
2. Ability to change posture	Low	Medium	High
3. Type of work surface	Hard floor	Firm floor	Soft floor
4. Characteristics of footwear used	Unsuitable	Acceptable	Ergonomic
5. Space available for movement	Restricted	Limited	Ample
6. Has reported discomfort from performing activities	None	Occasional	Frequent
7. Ability to take breaks	Never	Sometimes	Always

Full name and signature: _____

Figure 2. Mobility questionnaire administered to operating personnel.
Source: prepared by the author.

The detailed criterion for scoring each factor is shown in Table 2. The sum of the seven factors yields each person's overall risk level according to the following ranges (Table 3):

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Total score	Risk level
7	Low
8–14	Medium
15–21	High

Table 2. Equivalence between total score and standing-related risk level.
Source: prepared by the author based on the STPS Provisions (DIARIO OFICIAL DE LA FEDERACIÓN, 2025).

Factor assessed	Low (1)	Medium (2)	High (3)
1. Continuous time standing	0 to 30 min	30 to 60 min	More than 60 min
2. Ability to change posture	Yes, frequently	Sometimes	Cannot change posture
3. Type of work surface	Soft floor (mat, carpet, or anti-fatigue surface)	Firm floor (wood, planks, or rubber)	Hard floor (concrete, ceramic, or similar)
4. Characteristics of footwear used	Ergonomic, with good support	Acceptable, not specialized	Unsuitable, hard, or unsafe
5. Space available for movement	Ample, unrestricted movement	Limited, without obstacles	Very restricted or none
6. Reported discomfort	None	Occasional fatigue, pain and/or heaviness	Frequent lower back pain, swelling and/or cramps
7. Breaks or alternative tasks	Planned breaks at regular intervals	Unscheduled (informal) breaks	No break available

Table 3. Mobility questionnaire administered to operating personnel, with score equivalence by level (1 = Low, 2 = Medium, 3 = High).
Source: prepared by the author based on the STPS Provisions (DIARIO OFICIAL DE LA FEDERACIÓN, 2025) and NOM-036-1-STPS-2018.

The questionnaire was administered to all operating personnel in Warehouse, Arrivals, Pre-inspection, and the Organization's facility at Mexico City International Airport (AICM), distinguishing the type of standing involved in each job — dynamic for Operating Assistants, static for Forklift Operators — and recording the ergonomic risks associated with each activity (inadequate postures, trunk twisting while carrying loads, repetitive movements). Results are presented in aggregate form without identifying the individuals assessed, for confidentiality reasons.

2.3 Calculation of seats per area

Using risk level as the allocation criterion, the next procedure consisted of calculating how many chairs were needed in each operating area, based on the total number of employees and the defined rest times. Breaks last a maximum of 10 minutes for every three hours actually worked. Because staff start times are staggered — each employee counts the working day from their own start time — a reference window of 2 hours (120 minutes) was adopted and divided

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by the cycle time (T = 15 minutes), yielding 8 rest slots to distribute throughout the shift. Table 4 shows how these eight rest slots are distributed according to each shift's start time.

Start (shift)	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8
08:00	10:00–10:15	10:15–10:30	10:30–10:45	10:45–11:00	11:00–11:15	11:15–11:30	11:30–11:45	11:45–12:00
09:00	11:00–11:15	11:15–11:30	11:30–11:45	11:45–12:00	12:00–12:15	12:15–12:30	12:30–12:45	12:45–13:00
10:00	12:00–12:15	12:15–12:30	12:30–12:45	12:45–13:00	13:00–13:15	13:15–13:30	13:30–13:45	13:45–14:00
11:00	13:00–13:15	13:15–13:30	13:30–13:45	13:45–14:00	14:00–14:15	14:15–14:30	14:30–14:45	14:45–15:00
12:00	14:00–14:15	14:15–14:30	14:30–14:45	14:45–15:00	15:00–15:15	15:15–15:30	15:30–15:45	15:45–16:00
21:00	23:00–23:15	23:15–23:30	23:30–23:45	23:45–00:00	00:00–00:15	00:15–00:30	00:30–00:45	00:45–01:00

Table 4. Rest slots by shift start time (eight 10-minute periods per working day).
Source: prepared by the author.

The following variables were defined:

P = number of employees considered in the area;

T1 = rest time allocated per person (10 minutes);

T2 = changeover time between breaks, required to avoid interrupting operations (5 minutes);

T = total rest-cycle time, the sum of T1 and T2 (15 minutes).

The number of rest periods available in the reference window is obtained using Formula (1), and the number of chairs required per area using Formula (2):

Formula (1): Rest periods = (Reference window in min) / T

Formula (2): Number of chairs = P / Rest periods

This procedure was applied independently to each operating area of the bonded facility (Warehouse, Arrivals, and Pre-inspection) and to the Organization's facility at AICM, using each area's own number of employees P; the numerical results for each area are presented in the Results section. With the chairs calculated and allocated by area, compliance was also established with the obligation in Article 132, subsection V, of the LFT to keep sufficient seats available for personnel who work standing.

2.4 Schedule distribution scenarios

Time spent standing is not the same across all areas of the facility: it depends on the operational workload, each team's start time, and the type of activity performed. A single rest schedule was therefore not established for the entire Organization; instead, several distribution scenarios were designed so that each area could adjust the timing and frequency of breaks to its

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own conditions without slowing operations. This idea draws on Castro Figueroa and Ramos Carrillo (2025), who recommend alternating between standing and sitting to reduce the risk of injuries from prolonged standing.

Under this principle, six scenarios (A to F) were designed, each with a different distribution of the first break and the time worked before and after the meal break, allowing each area to choose, at implementation, the one best suited to its operating conditions without slowing operations; the decision is not fixed and can change as operations change. The six scenarios are detailed in the Results section (Tables 7 to 12). Final selection of a scenario for each area is outside the scope of this work and is identified as future work.

2.5 Work instruction and communication materials

To conclude planning, a work instruction for taking breaks during standing work was drafted, specifying the activities in sequence and who is responsible for each. The instruction was divided into two diagrams: one for overall process planning and implementation (Figure 3) and another specifically for taking a break during the working day (Figure 4).

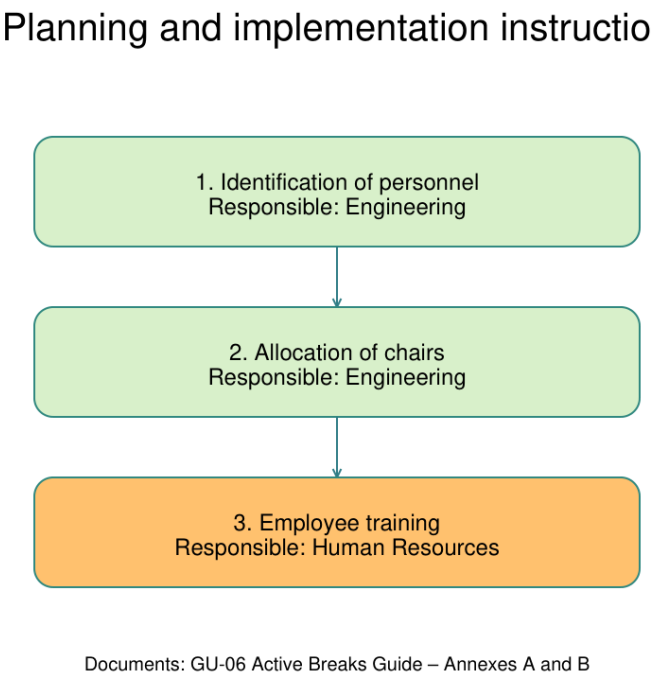

Figure 3. Instruction for planning and implementing the Amendment.
Source: prepared by the author.

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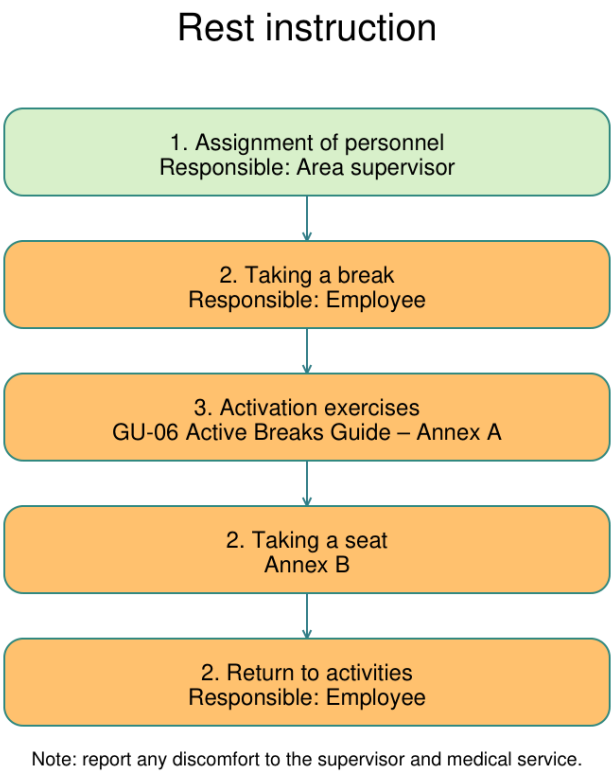

Figure 4. Instruction for taking a break during the working day.
Source: prepared by the author.

To inform and train personnel, two graphic resources were also prepared to accompany the instruction: an Active Breaks Guide with physical activation exercises organized by body region (Appendix B), and an infographic on correct standing posture, showing the angles and positions recommended to reduce muscular fatigue during the working day (Appendix C). These materials have a dual purpose: to help personnel better understand the Amendment and to adopt it correctly in practice, beyond the written documents.

3. Results and discussion

Application of the methodology described produced five concrete outputs for planning implementation of the Chair Law in the Bonded Facility: the Chair Law Policy, the standing-risk assessment, the calculation of seats per area, the rest-schedule distribution scenarios, and the work instruction with its communication materials. Planning followed ten stages, from publication of the Amendment to production of the communication materials for personnel:

1) publication of the Chair Law Amendment;
2) publication of the STPS Provisions on the Chair Law;
3) preparation of the corresponding documentation;

4) ergonomic study of occupational risks from standing;
5) preparation of the Policy on the Chair Law Amendment;
6) risk matrix;
7) work instruction for taking breaks during standing work;
8) schedule distribution scenarios;
9) active-break guide; and
10) posters on active breaks and correct posture when resting.

3.1 Chair Law policy

The Chair Law Policy was drafted and published within the Organization's Integrated Management System (SGI), formally fulfilling the employer obligation arising from Article 132, subsection V, and subsection XVII Bis of Article 133 of the LFT.

3.2 Ergonomic study and risk assessment

The mobility questionnaire (Table 2) was administered to the 79 people who work standing in the Bonded Facility's operating area, using the scoring system in the STPS Provisions (DIARIO OFICIAL DE LA FEDERACIÓN, 2025). For full application of the seven-factor risk matrix (Appendix A), a sample of 18 people was used, and the risk distribution observed in that sample (3 at low risk, 8 at medium risk, and 7 at high risk) was projected proportionally to all 79 employees in the operating area (Table 5).

Risk level	Workers assessed (projection)	Percentage
Low	13	16.7%
Medium	35	44.4%
High	31	38.9%
Total	79	100%

Table 5. Standing-related risk level projected to all employees in the operating area (n=79), based on the distribution observed in the sample assessed using the complete matrix (n=18).
Source: prepared by the author.

This projection should be interpreted with caution: the sample assessed with the complete matrix (18 people) represents only 22.8% of the operating population (79 people), so the distribution in Table 5 is a proportional estimate rather than the result of assessing all personnel. An extract of the risk matrix applied to the sample is presented in Appendix A. Subject to that qualification, the finding confirms that more than three quarters of the personnel assessed (83.3%) are at medium or high risk, indicating that ergonomic seating should be

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allocated as a priority to these two groups, with the characteristics required by item f) of the DOF Provisions (DIARIO OFICIAL DE LA FEDERACIÓN, 2025) for a seat or chair with a backrest.

Analysis by job revealed more specific risks. Among operating assistants, who perform dynamic standing work, and forklift operators, who perform static standing work, inadequate postures and trunk twisting while transporting loads stand out, together with the repetitive movements associated with loading, transport, stacking, organization, and sorting in the Warehouse area. The same analysis identified the level of attention required by area: Pre-inspection and Warehouse were rated “Good” for both exertion and conditions, while Arrivals was rated “Good” for exertion but “Fair” for conditions. This difference reflects the fact that the Bonded Facility’s inspection points do not operate in the same way.

3.3 Calculation of seats per area

Using the 79 employees of the main Bonded Facility (58 in Warehouse, 12 in Arrivals, and 9 in Pre-inspection) and the procedure described in section 2.3, chairs were allocated by area as shown in Table 6. In Warehouse (P = 58), Formula (1) yields 8 rest periods in the reference window and Formula (2) gives 8 employees per period; 10 chairs were provided, taking the area’s operations into account. In Arrivals (P = 12) and Pre-inspection (P = 9), the same procedure yielded 2 chairs per area, with 4 chairs also provided in Arrivals because it has two receiving points. The same exercise was repeated for the Organization’s facility at AICM (P = 8 employees), which was allocated 2 chairs.

Area	**Employees**	**Chairs allocated**
Warehouse	58	10
Arrivals	12	2
Pre-inspection	9	2
Bonded Facility subtotal	79	14
AICM	8	2
Total	87	16

Table 6. Results of the calculation of seats per area.
Source: prepared by the author.

Together, the two facilities have 16 chairs distributed by operating point, meeting the sufficient-seating requirement in Article 132, subsection V, of the LFT. Rest-schedule slots were also defined after personnel start each shift (08:00, 09:00, 10:00, 11:00, 12:00, and 21:00), establishing up to eight 10-minute rest periods per working day according to each employee’s shift start time.

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3.4 Schedule distribution scenarios

Two scenarios (A and B) were designed, each with a different distribution of the first break and the time worked before and after the meal break (Tables 7 and 8). Each table represents the full working day in one-hour blocks: working time in green; in orange; and, in blue, the rest-schedule zone within which the 10-minute break is taken. These alternatives allow the Organization to select, for each area, the scenario best suited to its operational workload at the time of implementation.

Scenario / hours	1	2	3	4	5	6	7	8	9
A			Rest-schedule zone			Meal break			

Table 7. Scenario A. The 10-minute break is taken on a staggered basis from the end of the second hour worked through the end of the third hour worked, counted from the start of the working day.
Source: prepared by the author.

Scenario / hours	1	2	3	4	5	6	7	8	9
B				Meal break			Rest-schedule zone		

Table 8. Scenario B. The order is reversed: work comes first, the meal is taken in the fourth hour, and the 10-minute break is taken on a staggered basis after the second hour worked following the meal through the end of the third hour worked after the meal.
Source: prepared by the author.

Neither scenario was selected as definitive for any particular operation: that decision, together with execution of the planned measures (seat installation, implementation of the work instruction, and monitoring of the active-break program), falls outside the collaboration period covered by this work and is identified as future work.

3.5 Work instruction and communication materials

The following deliverable documents were prepared to support employee communication and training: the Chair Law Policy; the standing-work instruction, with 8 steps distributed among Engineering, Human Resources, Supervision, and the employee (Figures 3 and 4); the Active Breaks Guide, with physical activation exercises organized by body region (Appendix B); and the infographic on correct posture when resting (Appendix C). Together, these documents — alongside the Policy, the ergonomic study and its risk matrix, the seating calculation, and the schedule scenarios — constitute the documentary evidence for the planning stage of Chair Law implementation in the Bonded Facility.

3.6 Discussion

The findings of this work agree with those reported by Juárez Ochoa et al. (2025), who developed a standardized methodological guide for ergonomic analysis and alignment with the Chair Law in a maquiladora company in Ciudad Juárez and noted that the absence of established ergonomic methodologies makes it difficult for organizations to respond promptly to the Amendment. This case confirms that gap and adds, beyond risk assessment, an additional layer of resource sizing — calculation of seats per area and design of schedule scenarios — that is outside the scope of that guide and is necessary to move from risk identification to a plan executable on the operating floor.

The comparison with Alvarado Valera et al. (2025), who document the legal and operational challenges faced by micro and small enterprises (MYPES) in Ixtlán del Río, Nayarit, in implementing working-hour provisions and the Chair Law, is equally relevant. Unlike those MYPES, which according to the authors face structural staffing and resource limitations in documenting and systematizing compliance, the Bonded Facility had dedicated Engineering and Legal departments that enabled a formal, documented, and replicable process to be built (policy, risk matrix, work instruction). This difference suggests that an organization's ability to comply with the Chair Law in a planned rather than merely reactive manner depends largely on its size and availability of dedicated technical resources, a point consistent with Industrial Engineering's resource-sizing approach.

Lastly, the main limitation of this work is the one already noted in section 3.2: the complete risk matrix was applied to a sample of 18 people (22.8% of the operating population of 79), so the risk distribution for all employees is a statistical projection rather than a census assessment. Extending the risk matrix to all personnel, selecting the final schedule scenario for each area, and measuring the impact of implementation once completed are the most direct avenues for future work arising from this study.

Conclusion

This work documented the planning phase for implementing the Chair Law in a bonded facility, using the 5W+1H methodology as a guide. The methodology's six questions led to five deliverable documents: the Chair Law Policy, the ergonomic study and its risk matrix, the calculation of seats per area, the rest-schedule distribution scenarios, and the work instruction with its communication materials.

It is important to emphasize that this work is not, and was not intended as, a legal or administrative exercise, but addresses a problem specifically relevant to Industrial Engineering. Assessing standing-related risk falls within ergonomics and occupational safety; calculating the number of chairs needed per area is a resource utilization and optimization problem similar to those solved in line balancing or capacity planning; designing the two rest-schedule scenarios is essentially an exercise in shift design and work study; and the work instruction, with its roles and sequence of activities, is a typical output of process design.

The scope of this work is limited to planning. Risk assessment using the complete matrix was performed on a sample of 18 people from an operating population of 79, so its projection to the total should be considered subject to the qualification stated in the Discussion section. Similarly, final selection of the rest scenario applicable to each area and actual execution of the planned measures fell outside the collaboration period and are proposed as future work.

The planning methodology used is applicable to any workplace with personnel engaged in prolonged standing that must comply with the Amendment, providing not only a case study but also a procedure that other industrial engineers working in occupational safety and hygiene can adapt to their own operating environments.

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Appendix A. Determination of standing-related risk level in the sample assessed (n = 18)

a	b	c	d	e	f	g	Total	Risk level
0	0	0	0	0	0	0	0	Low
3	1	3	2	1	1	2	13	Medium
2	3	3	2	1	2	1	14	Medium
3	2	3	2	2	1	2	15	High
3	1	2	2	2	2	2	14	Medium
3	3	2	2	3	1	2	16	High
3	1	3	2	1	1	1	12	Medium
3	2	3	2	2	1	2	15	High
3	3	2	2	3	1	2	16	High
3	3	3	2	1	1	2	15	High
3	3	3	2	1	2	2	16	High
3	2	3	3	1	2	2	16	High
0	0	0	0	0	0	0	0	Low
3	2	2	2	1	2	2	14	Medium
2	2	3	3	1	1	1	13	Medium
3	1	3	2	1	2	1	13	Medium
0	0	0	0	0	0	0	0	Low
3	2	2	3	1	1	2	14	Medium

Note. Factors: a) time spent standing; b) ability to change posture; c) type of work surface; d) footwear characteristics; e) space available for movement; f) reported discomfort; g) breaks or alternative tasks.
Source: prepared by the author.

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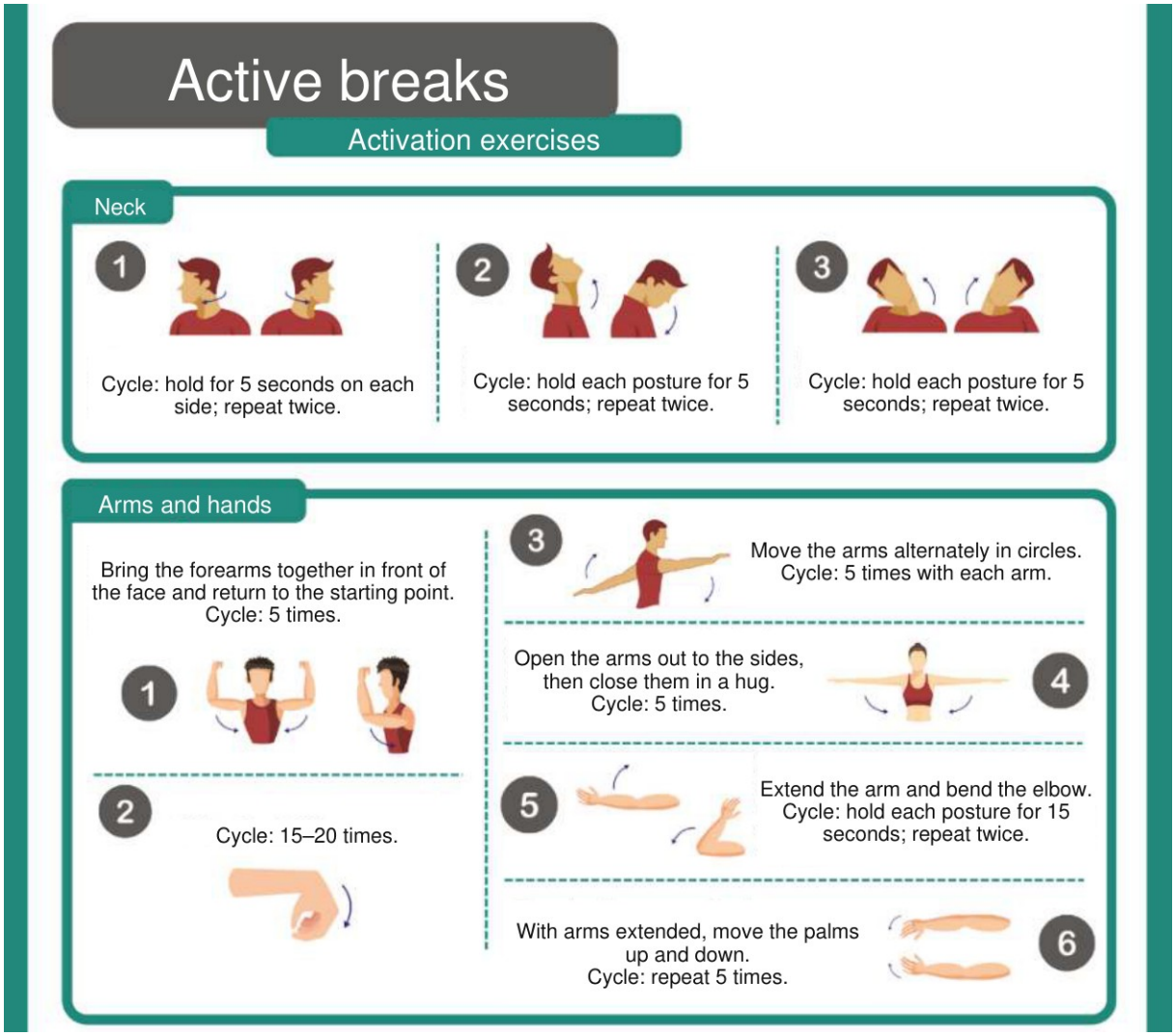
Appendix B. Active Breaks Guide



Active-break guide with physical activation exercises by body region. Source: prepared by the author.

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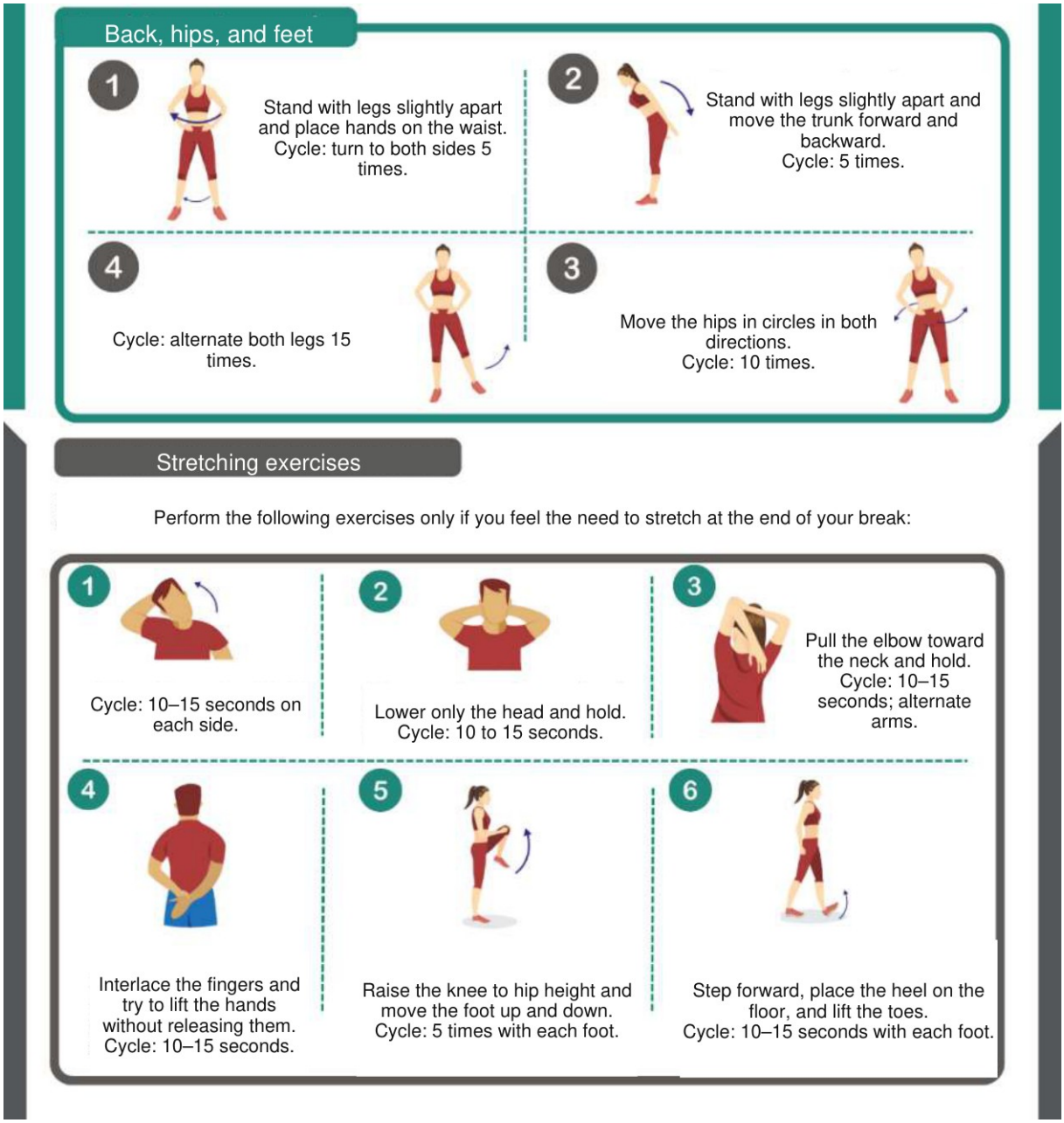
Appendix B. Active Breaks Guide — continued



Active-break guide with physical activation exercises by body region. Source: prepared by the author.

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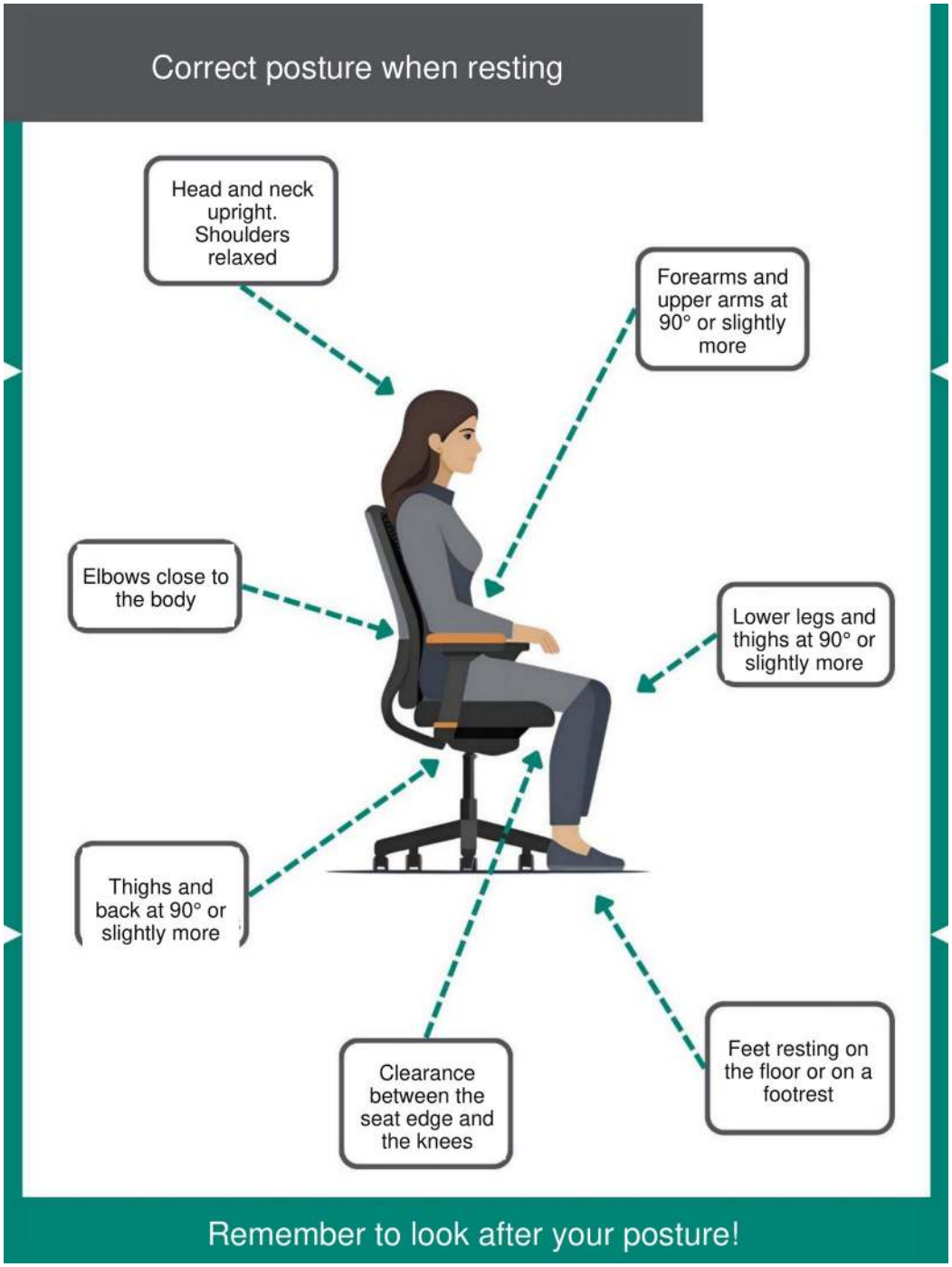
Appendix C. Correct posture when resting



Infographic on correct posture for taking a break from standing work. Source: prepared by the author.