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Integrating ISO 45001 and U.S. OSHA Standards: A Global Leader's Roadmap for EHS Harmonization in Multinational Operations

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Abstract: The article examines the problem of harmonizing the international ISO 45001 standard and the prescriptions of the U.S. Occupational Safety and Health Administration (OSHA) as a key challenge for transnational corporations operating within globalized production–logistics networks. The study aims to identify points of divergence and overlap between the two regulatory systems and to develop a practical roadmap enabling companies to minimize bureaucratic overhead and transactional losses while simultaneously strengthening the protection of worker health and safety. The work's relevance is conditioned by the fact that, amid intensifying international competition and more demanding expectations from regulators, investors, and consumers, occupational safety has ceased to be an optional practice and has become a factor of resilience and corporate survival. The research novelty consists in proposing a three-tier integration model that unites corporate policy, standardized procedures, and a digital analytics platform, synchronizing the managerial grammar of ISO 45001 with the operational lexicon of OSHA. Discrepancies between reporting systems and risk-assessment methodologies were found and are, in the main, what lead to duplicated registers mounting penalties and bureaucratic burden. Risk-management consolidation simultaneously utilizing ISO and OSHA within one contour immediately eliminates gaps evidenced by reduced lost-time rates as well as injury frequency in corporate case material. The highest protection principle - wherein the strictest requirement is taken, whether from any jurisdiction - forms a central condition of sustainable leadership and the formation of a global culture of zero tolerance for incidents happening to workers. The article will be helpful to occupational-safety researchers, corporate EHS managers, and practitioners responsible for building integrated safety-management systems in multinational organizations.

Keywords: ISO 45001, OSHA, standard harmonization, occupational safety, global companies, corporate policy, risk management, industrial safety

I. Introduction

When every smartphone assembled in Shenzhen and every bag of coffee roasted in São Paulo embodies the labor of workers across dozens of sites and jurisdictions, occupational safety ceases to be local. It becomes a global corporate obligation to society. According to the International Labour Organization, roughly 3 million people die annually from work-related accidents and diseases—this is five percent higher than in 2015—and thus every unit of output carries the price of human life, hidden deep within production–logistics chains [1]. Such alarming statistics compel states to tighten import barriers, consumers to demand transparency of product origin, and investors to embed occupational safety into ESG ratings.

A multinational enterprise, in its choice, either duplicates dozens of national regulations, wasting resources on overcoming terminological mess, or realizes a necessity to accept one methodology. In the past seven years, ISO 45001 has become the general language. According to the ISO Survey 2023, by the end of 2023, there were 185,166 ISO 45001 certificates all over the world, covering more than 309 thousand production sites; data from the central Chinese accreditation body was not included in the report, which goes on to underline even wider diffusion of the standard [2]. Its popularity is explicable: it delineates a closed managerial cycle from context analysis to corrective actions, allowing companies to adapt technical solutions to local conditions while creating a single evidentiary base for auditors and unions.

However, sites located in the United States—indeed any enterprise exporting to the U.S. market—must account for the prescriptions of the U.S. Department of Labor's OSHA. This regulator acts precisely: The National Emphasis Program on amputations, renewed in June 2025, focuses inspectors and requires the implementation of technical solutions beyond procedural instructions [3]. Simultaneously, OSHA is spreading a network of cooperative alliances: in fiscal year 2024, propagating safety requirements to contractors and sub-suppliers through the whole value chain by agency engagement with 295 partners [4].

A unique bilingual environment comes into play: ISO 45001 sets the grammar of management, OSHA provides the vocabulary of concrete barriers, safeguards, and energy-control procedures. Without translation

from one language to the other, the global risk-management system falls apart: early warning indicators calculated in the ISO metric do not match OSHA Form 300 reporting, and American inspectors do not take internal auditors' findings. Hence, a modern harmonization roadmap begins by acknowledging that both languages must sound in unison: corporate policy fixes principles inspired by ISO, and operating procedures cite the paragraphs of 29 CFR in detail. Only under this approach does the slogan of zero tolerance for injuries cease to be a declaration and become a controllable process, measured in the same units on all continents.

II. Materials and Methodology

The study rests on a systematic analysis of the regulatory base, empirical data, and corporate practices. The theoretical component draws on international statistics and institutional reviews: the International Labour Organization's data recording nearly three million annual deaths from accidents and occupational diseases [1], and the ISO Survey 2023 results showing exponential growth in ISO 45001 certifications [2]. As a counterpoint, updated OSHA documents were used, including the National Emphasis Program on amputations [3] and alliance-program reports [4], which made it possible to reveal the contrast between the managerial cycle of the international standard and the instrumental approach of the American regulator. Another layer included regulatory initiatives on over-reporting [5] and World Bank economic studies on fixed compliance costs amid conflicting norms [6]. The empirical base came from several sources. First was academic research that directly connected competitive pressure with the magnitude of penalties for violations in safety, and systematic reviews of risk perception, and safety-management standards' effectiveness in reducing incident frequencies [8, 9]. Secondly, corporate materials from BAT described a manufacturing network located on six continents [10], an internal policies and procedures system [11], plus aggregated data on the dynamics of safety metrics [12]. This layer enables one to see how formal standards metamorphose into operational practice and what results from moving to a three-tier harmonization model. Third, as an indicator of technological transformation, industry forecasts for the EHS-software market were used [13], showing that digital infrastructure has become an indispensable component of integration.

Methodologically, the study combines comparative analysis of regulatory documents, content analysis of corporate cases, and secondary analysis of statistical data. The comparative analysis aligned key elements of ISO 45001 and OSHA 29 CFR, identified zones of overlap and contradiction, and produced a map of procedural and reporting disparities. The content analysis of corporate practices showed how unified principles are adapted across jurisdictions, as well as how duplicative protocols and parallel registers are eliminated.

III. Results and Discussion

Despite corporate declarations of one standard—one team, reality often consists of parallel site-level injury logs, duplicated training protocols, and even divergent recalculation formulae for identical indicators. A document submitted to OSHA requires a different event coding than an internal ISO 45001 report; as a result, a foreman spends hours translating the same event from the language of 29 CFR into the language of clause 10.2 of ISO. The regulator itself acknowledges that unnecessary duplication of effort remains a problem and seeks to mitigate it via Paperwork Reduction Act procedures, underscoring the need to minimize excessive reporting forms for enterprises [5]. The economic footprint of such divergences is less obvious but measurable: a World Bank study found that fixed costs of complying with incompatible technical regulations average USD 425,000 per firm, or roughly 4.7% of value added [6]. The broader the geography of deliveries, the higher the likelihood that these sums will multiply geometrically, since each new jurisdictional requirement triggers a cascade of procedural copies.

Where reporting diverges, a risk of regulatory rupture arises: an event classified as a near miss in the corporate system may be qualified by an inspector as a serious violation carrying a maximum sanction. Empirical analysis of U.S. public companies shows that those facing tough product-market competition pay markedly higher safety-violation penalties when internal and external requirements diverge [7]. Incomplete overlay of ISO procedures onto OSHA requirements is thus not merely a methodological failure but a direct source of financial loss and reputational damage.

Finally, parallel systems erode productivity: a global analysis of the economic costs of unsafe working conditions estimated aggregate losses at 5.4% of global GDP—and a substantial share of this sum is linked not to injuries themselves but to added bureaucracy, equipment downtime, and re-implementation of like-for-like measures at each site [8]. Where enterprises shifted to a unified risk-management system and obtained ISO 45001 certification, injury and illness frequency decreased on average by 20% relative to comparable sites [9], precisely because fragmented registers disappeared and a single window for analyzing leading and lagging indicators emerged. Harmonization, therefore, is not cosmetic tidying of documents; it liberates capital and human resources, cutting hidden transactional costs of global operations.

The global health, safety, and environment manager, Junaid, arriving at BAT from heavy-engineering projects, received a mandate spanning six continents and all three corporate regions—United States, Americas–Europe, and Asia–Pacific, Middle East and Africa. His remit covers 67 of the Group's owned manufacturing sites whose daily work shapes the company's global value chain [10]. He inherited a fragmented picture in which U.S. facilities were tuned to 29 CFR paragraphs, while plants in South Africa and Singapore adjusted to local labor-law discrepancies—producing the duplications and penalty risks described earlier.

To restore coherence, Junaid built a three-tier harmonization model. The first layer is an updated corporate policy grounded in the Environment, Health and Safety Guide, which BAT has formally made public, thereby enshrining uniform obligations for all subsidiaries [11]. The second layer contains twelve critical procedures that flow general principles into step-by-step instructions: lockout–tagout of energy sources, work at height, thermal-environment assurance, etc. Dual citation lines accompany each procedure—the ISO 45001 clause for purposes of methodological sequencing and the specific 29 CFR sub-paragraph for reference required to make it enforceable. The third layer is a digital analytical superstructure—an integration bus collects primary data on incidents, training, and near-miss linkages. A unified monitoring dashboard flags potential serious-injury exposure, plus automatically generates OSHA Forms 300 and 301.

This three-tier architecture is not a metaphor but a living management mechanism in which each site views its deviations not retrospectively but in real time. Within two years of launch, the metrics began to shift: if in 2022 the lost-time rate was 0,19, by the end of 2024 it had fallen to 0,12—the lowest level in the Group's history, as shown in Table 1 [12].

Table 1: Three-Year Safety Performance Trends [12]

Metric	**2024**	**2023**	**2022**
Lost time incidents (LTIs)	43	58	75
Restricted work cases (RWC)	9	20	8
Lost time incident rate (LTIR)	0,12	0,17	0,19

An additional maturity indicator is the share of shop floors and administrative sites with zero lost-time injuries.

Thus, the figures are merely a consequence of a paradigm shift: the overarching policy sets the frame of safety, processes convert it into tangible actions, and analytics bring weak signals to the surface before they materialize as penalties or tragedies. In this way, the three-tier system, grounded simultaneously in ISO 45001 and OSHA prescriptions, closes the very regulatory gap that had inflated bureaucracy and costs, turning the zero tolerance for injuries slogan into a measurable—and therefore governable—commitment.

The transition from the declaration safety is an intrinsic value rather than a line item to genuine synergy between the international standard forty-five thousand one and the requirements of the Occupational Safety and Health Administration is possible only when a company voluntarily steers toward the strictest applicable norm. The principle of highest protection, encoded in the updated corporate policy, becomes a kind of tuning fork: if in some country a higher noise level is permitted than U.S. labor law allows, the stricter threshold becomes mandatory, while the local norm goes to a footnote, not into practice. Disputes between legal departments and operations thus evaporate: the choice always falls on the greatest good for the person, not the lowest cost for the budget.

Once this value vector is fixed, a baseline gap analysis follows. A cross-functional team places all operating procedures on a single map, compares them with the provisions of the international standard and the paragraphs of Title 29 of the U.S. Code of Federal Regulations, and then arrays a chain—from points of absolute alignment to gaping voids. This stage, which seems desk-bound, in practice exposes parallel risk registers, divergent severity scales, and incompatible lost-time calculation methods. Each heterogeneous detail becomes a task with an accountable owner and a deadline; otherwise, the initial map remains a museum piece, not an instrument.

Next, a unified hazard register is formed. Any potential threat—from high ambient temperature to an unisolated conveyor line—is assessed via a standardized matrix in which full textual descriptors of severity and probability substitute for bare numerals. Under each entry, the hierarchy of controls is automatically attached: engineering barriers, administrative measures, and personal protective equipment. The system makes plain where an enterprise continues to rely on a hard hat and a reminder where an engineering cut-off valve is long overdue.

Once the foundation of risk perception is laid, the company turns to people, because without their engagement, the most elegant procedure remains paper. The competency-development program is built

stepwise: first, the awakening of attention and personal responsibility, then the sharpening of specialized skills, and at the apex, the role of culture carriers who initiate improvements themselves and transmit experience to peers. Part of the training is in-person—simulators, practical drills, emergency simulations; part occurs in a virtual environment with illustrative cases and self-check modules. This hybrid, created on a shared methodological language, spares workers confusion: there are no American and international courses—there is one set of rules, described in different words for different ears but with the same meaning.

Accumulated knowledge bears fruit only when converted into transparent data. The electronic platform automatically prepares the registers required by the American regulator while simultaneously forming performance indicators accepted in the international standard. The foreman no longer needs to complete two reports: the system itself routes records to the proper fields, whether an incident line item or a table of leading indicators. Seeing a single dashboard, a manager instantly perceives where risk is rising, and an investor or inspector can view the exact figures without waiting for a translation.

The cycle ends with a combined audit. The internal team—armed with the international standard's checklists—and an invited specialist speaking the American inspector's language walk the shops together, ask clarifying questions, and record nonconformities in a unified format. Each detected deviation passes through the plan–do–check–act loop: once analysis reveals a weak point, the process is immediately corrected, and the correction is again tested for effectiveness. Thus emerges a continuous spiral of improvement, shown in Fig. 1, in which there is no place for the old gaps: at each turn, both global rules and national nuances are verified, and the outcome is not abstract harmony of standards but a tangible reduction in injuries, downtime, and bureaucratic loss.

Fig. 1: Achieving Safety Synergy

When the company's philosophy of highest protection already sets the vector, attention shifts to those areas toward which the American regulator will soon direct the main force of inspections. Foremost remains the initiative on amputation prevention, requiring that every operation to isolate and de-energize equipment be accompanied not by a laconic memo but by a whole scenario of lockout—tagout—verification of energy isolation. In this scenario, engineering barriers are described meticulously, without abstraction: the cut-off point, valve sequence, and the person responsible for restart. Next comes the program against heat stress, where a wall thermometer becomes only one among many signal thresholds. Workers exposed to heat receive an algorithm

for hydration, a schedule of micro-breaks, and access to wearable devices that record heart-rate recovery. The third pillar is the climate and equity agenda: safety assessment no longer stops at the physical parameters of the shop; it accounts for whose physiology is more fragile or whose access to rest resources is smaller. This shift percolates into the international standard's section on organizational context analysis, forcing rewrites of the stakeholder map and a fresh ranking of risk factors.

To see how these new emphases affect reality, a live indicator panel is required. Potential serious-injury probability, near-miss frequency, and the share of identified unsafe acts are like reading a seismograph wave, getting ready to reposition people and equipment before the jolt below ground turns bad. Sitting just below are lagging metrics: lost time rate, total recordable incident rate, and the money trail of medical expenditures. Rounding out the structure are maturity indicators: closure velocity of corrective actions, employee engagement levels, and unit self-assessment scores on the cultural-development scale. In aggregate, these blocks form not just a report but a navigational chart, each point tied to a specific normative paragraph, whether of the international standard or the U.S. federal rules. The growth of the market proves the effectiveness of the solution. The environmental health safety software market is valued at USD 2.24 billion in 2025 and is forecast to reach USD 3.73 billion by 2030, advancing at a 10.7% CAGR, as shown in Fig. 2 [13].

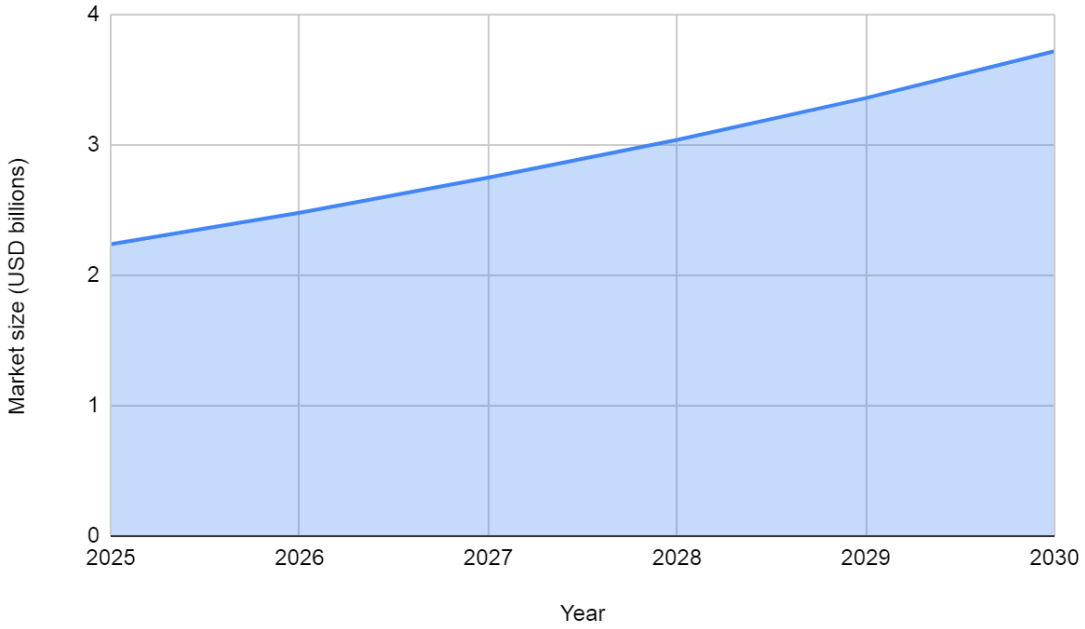

Fig. 2: EHS Software Market Size [13]

The alloy of requirements does not remain within factory fences. The roadmap methodology for partners descends progressively through the supply chain. Auditors first visit direct suppliers, then proceed to their contractors, and further down the supply chain, until reaching farms where raw inputs are grown. It is not only hard hats and guards that are checked: local managers must understand how to correlate their own regulations with the unified hierarchy of controls documented in corporate policy. Where gaps are found, a development plan is drawn up, including training, equipment modernization, and access to financing for protective gear. On repeat visits, what is assessed is not coverage percentages but changes in behavior and the durability of practices. Gradually, a network of reciprocal commitments takes shape: the parent company guarantees demand and support, and partners commit to improving safety, measured by the same indicators as at the lead sites. Thus, a single system turns from a normative edifice into a living ecosystem in which every participant shares common views of risk, responsibility, and the value of human life.

IV. Conclusion

The harmonization of ISO 45001 and OSHA prescriptions in transnational companies confirms that safety management in the age of global production–logistics networks has ceased to be the choice of individual enterprises and has become an imperative of corporate survival. By examples of systematic differences between the international standard and the American regulator, it will be seen that parallel registers, mismatched reporting formats, and unsynchronized risk-assessment methodologies generate not just bureaucratic burden but direct economic losses, increasing corporate vulnerability to sanctions and reputational risk. The unified safety

architecture is consequently not an academic thesis but rather a condition of lowering transactional costs as well as raising resilience in the global value chain.

The experience considered with a three-tier model—from updated corporate policy to a digital analytical superstructure—demonstrates that synchronous use of ISO's grammar and OSHA's lexicon can eliminate regulatory rifts and form a through-line language of risk management. Concrete results in the form of reductions in lost-time rates and fewer injuries confirm that integration of standards does not end with a declaration of the value of life but is expressed in a measurable improvement in working conditions. The primary rule here is the idea of excellent safety, where in every place the brutal rule is used as needed by law, thus easing stress between local regulations and the company's worldwide duty.

This makes the harmonization roadmap an obligation not just for internal divisions but for all partners and suppliers, creating an ecosystem of reciprocated obligations. Only in such an environment can the synergy of ISO 45001 and OSHA move beyond just paper compliance to actual safety culture compliance at every stratum—top corporate strategy to individual shopfloor practice—contained within one unified contour of analysis and improvement. Thus, the construction of an integrated EHS model becomes a key condition of global leadership, where the value of human life is secured not in reports but in the everyday practice of a multinational company.

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