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Risk-Based Communication Model for the Prevention of Serious Injuries and Fatalities at PT XYZ

[1]Perie Anugraha Wiguna*, [2]Ari Hernawan
[1] Applied Master's Study Program in Occupational Safety and Health Department of Health Services and Information, Vocational School, Universitas Gadjah Mada, Indonesia*; email: perieanugraha7@gmail.com
[2] Universitas Gadjah Mada, Indonesia
*Correspondence

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Abstract
Introduction: *Serious injuries and fatalities (SIF) remain critical challenges in facility service operations, where risk messages often fail to translate into safe frontline behavior.* ***Objective:*** *This study aimed to develop and validate a risk-based communication model to strengthen safety awareness, assertive behavior, and SIF prevention at PT XYZ.* ***Method:*** *A descriptive qualitative applied design was used through field observation, in-depth interviews, focus group discussion, document review, and expert judgment. Supporting data included incident records, workforce demographics, safety climate indicators, and a risk communication questionnaire involving 100 respondents.* ***Result and discussion:*** *Findings showed that existing communication channels were mostly linear, administrative, and text-based, causing habituation, information overload, and weak personal risk appreciation. Key barriers included safety silence, high power distance, low assertiveness toward senior workers, and service pressure that encouraged out-of-scope work. The S-C-F model integrated Standardization through visual Scope of Work cards, Confidence through Stop Work Authority and DESC scripting, and Feedback Loop through check-back communication for non-routine work. Expert validation produced a mean feasibility score of 3.68, indicating a very feasible model.* ***Conclusion:*** *The S-C-F model is applicable for improving risk communication and preventing SIF in high-risk facility service operations.*

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Introduction

Serious workplace injuries and fatalities (Serious Injury and Fatality/SIF) remain a persistent challenge in occupational safety and health (OSH) management, despite the widespread implementation of procedural systems and formal regulations. At the national level, workplace accident rates in Indonesia continue to reflect a concerning trend, with millions of workers exposed to high risks daily, particularly in the labor-intensive facility services sector operating in a decentralized, multi-client environment (Dandi, Damayanti, & Arifianto, 2025); (Maulani et al., 2025). This condition is exacerbated by the Safety Paradox phenomenon, wherein declining rates of minor incidents frequently create a false sense of security within organizations, while fatal risks remain latent and suboptimally managed. One of the most frequently overlooked root causes of SIF prevention failure is the breakdown of risk communication at the operational level. Effective risk communication is not merely a one-way transmission of technical information from management to workers, but rather an interactive process aimed at constructing collective understanding of hazards and their mitigation. When risk communication fails to function effectively, workers—particularly those who are newly employed and lack sufficient experience—tend to be unable to independently identify critical hazards, thereby significantly increasing the probability of fatal incidents (Amiroh, Sunarto, & Suryanto, 2025); (Setiawan & Bathesta, 2024)

This challenge is further compounded in organizations dominated by Generation Z, a cohort of digital natives whose cognitive characteristics and information-processing preferences differ markedly from previous generations (Nugrohojati & Linando, 2025). Conventional, one-directional safety communication approaches are no longer adequate to effectively reach this group (Fatliana et al., 2025); (Zara, Nordin, & Isha, 2023). Furthermore, psychosocial barriers such as the Safety Silence phenomenon—whereby workers withhold critical information due to fear of sanctions or uncertainty regarding their contractual status—and the high Power Distance inherent in Indonesian workplace culture, further undermine the effectiveness of existing OSH communication systems. These two barriers synergistically obstruct early detection of potential SIF events, resulting in critical hazard information never reaching decision-makers, or conversely, risky instructions going unchallenged by frontline workers (Noort, Reader, & Gillespie, 2021); (Dai, Li, Xie, & Deng, 2022).

In the context of PT XYZ, a facility services provider employing more than 43,747 workers, fatality incidents were confirmed to have occurred repeatedly during the 2024–2025 period (Kementerian Ketenagakerjaan RI, 2024). An analysis of internal conditions revealed that the root cause lies not solely in technical or procedural aspects, but rather in the distortion of risk message transmission between management policy and the actual behavior of frontline workers. This situation is made more complex by the fact that 67%, or approximately 29,310 of the total workforce, belong to Generation Z, who possess cognitive structures and information-processing preferences that differ from previous generations. A safety climate survey conducted using the NOSACQ-50 instrument among 890 respondents identified a significant gap of 0.35 points between the Worker Safety Commitment dimension and the Individual Risk Priority dimension, indicating that the established social safety norms have yet to effectively intervene in individual risk-taking behavior in the field (Fargnoli & Lombardi, 2020); (Hertanto, Erwandi, Widanarko, & Tejamaya, 2023).

The role of risk communication is frequently regarded merely as a supporting element rather than as a fundamental factor directly intervening in individual awareness

and behavior at the operational level. Moreover, no communication model has been specifically developed to address the cognitive characteristics of a cross-generational workforce—particularly Generation Z as digital natives—within a large-scale, multi-site facility services sector. The Safety Silence phenomenon, further intensified by high Power Distance in Indonesian workplace culture and the scarcity of senior mentors at only 3.7% of the total workforce, underscores the urgent need for a more adaptive and comprehensive communication system reconstruction.

Based on this gap, this study aims to identify existing risk communication barriers and to construct the S-C-F Risk Communication Model (Standardization, Confidence, Feedback Loop) as an integrative strategy for mitigating serious injuries and fatalities at PT XYZ. This model integrates the principles of Human and Organizational Performance (HOP) with a transactional communication approach to disrupt the fatality precursor chain, while simultaneously contributing to the development of OSH communication literature within the context of large-scale facility services industries dominated by a Generation Z workforce.

Method

This study employed a mixed methods approach using a research and development design, integrating qualitative and quantitative methods sequentially to construct and validate the S-C-F Risk Communication Model (Standardization, Confidence, and Feedback Loop) in the context of SIF prevention within high-risk work environments. The study was conducted at PT XYZ Indonesia, a facility management services company with a total workforce of 43,747 employees as of March 2026, focusing on three primary subject groups: frontline workers, supervisors, and HSE personnel operating in high-risk work areas. Particular emphasis was placed on Generation Z employees who comprise 67% of the organizational population and employees with less than one year of tenure who account for 27% of the total workforce, as both groups were identified as having the highest risk communication vulnerability.

Data collection was conducted through three primary instruments. A safety climate survey using the standardized NOSACQ-50 (Nordic Occupational Safety Climate Questionnaire) instrument was administered to 890 respondents to measure the gap between collective safety commitment and individual risk priority. In-depth interviews were conducted with key informants from HSE management, supervisory, and frontline worker levels to explore psychosocial risk communication barriers, including the Safety Silence and Power Distance phenomena. Field observations and internal document reviews were additionally carried out on lagging indicator data from 2024 through the first quarter of 2026, encompassing incident records, Medical Treatment Case (MTC) reports, and Lost Time Injury (LTI) data. The S-C-F Model was subsequently constructed based on a synthesis of these empirical findings and validated through two stages: theoretical validation by OSH and organizational communication experts through expert judgment, and empirical validation through pilot testing in selected high-risk work units.

Model feasibility was assessed based on the level of acceptability, ease of implementation, and relevance to the cross-generational workforce characteristics. Quantitative data from the NOSACQ-50 survey were analyzed using descriptive statistics, difference tests, and correlation analysis, while qualitative data from interviews and observations were analyzed through thematic analysis with open, axial, and selective coding processes. All analytical processes were conducted in adherence to the principle of data triangulation to ensure the validity and credibility of research findings

Result and Discussion

1. Result

Safety Incident Profile at PT XYZ (January 2024 – March 2026)

PT XYZ is a globally scaled integrated facility management services provider operating in Indonesia with more than 43,747 employees. During the period from January 2024 to March 2026, a total of 123 safety events were recorded across various incident categories. Two fatality cases occurred—one in 2024 involving a vehicle accident and one in 2025 involving electrocution of an MEP technician—accompanied by four Serious Incidents with the potential to escalate to fatalities. Medical Treatment Cases (MTC) dominated by frequency with 34 occurrences. These data reflect the manifestation of the Safety Paradox, wherein reductions in minor incidents do not correspond to reductions in fatality risk. The complete incident distribution is presented in Table 1.

Table 1
Frequency and Severity Distribution of Safety Incidents (January 2024 – March 2026)

Incident Category	Risk Nature	2024	2025	2026 (Jan–Mar)	Total	Notes
Fatality (F)	Critical (Actual SIF)	1	1	0	2	Vehicle accident (2024); electrocution (2025)
Serious Incident (SI)	High (Potential SIF)	3	0	1	4	High-severity incidents with fatality potential
Medical Treatment Case (MTC)	High Frequency	17	17	0	34	External medical treatment required
First Aid Injury (FAI)	High Frequency	5	14	0	19	Minor injuries treated on-site
Property Damage (PD)	Asset Damage	2	6	0	8	Facility or equipment damage
Near Miss (NM)	Proactive	3	4	0	7	Early hazard detection indicator
Vehicle Accident (VA)	Operational	4	1	0	5	Operational vehicle accidents
Grand Total	**Combined**	**36**	**43**	**44**	**123**	**Total safety events**

An investigation analysis of the August 2025 electrical fatality explicitly identified Inadequate Leadership/Supervision and Ineffective Communication of Work Scope as the primary root causes. The technician unilaterally relocated to a high-voltage ceiling area without supervisor coordination—a manifestation of transactional communication failure confirming that written procedures alone are insufficient without an effective risk communication system.

Workforce Demographic Profile and Risk Communication Implications

Of the total 43,747 employees, Generation Z represents the dominant cohort at 67% (29,310 individuals) and Generation Y at 33% (14,437 individuals). From a tenure perspective, 27% are new employees with less than one year of experience. Senior workers above the age of 50 comprise only 3.7% of the workforce, causing a disruption in the intergenerational transfer of safety values. The demographic distribution is presented in Table 2.

Table 2
Workforce Demographic Distribution at PT XYZ

Analysis Category	Sub-Category	Headcount (MP)	Percentage (%)
Generational Composition	Generation Z (19–27 years)	29.310	67%
	Generation Y (28–43 years)	14.437	33%
Tenure	< 1 Year	11.811	27%
	1–2 Years	17.499	40%
	> 2 Years	14.437	33%
Total Population		**43.747**	**100%**

Identification of Risk Communication Barriers (Questionnaire, N=100)

A questionnaire was administered to 100 respondents (67 from Generation Z, 20 from Generation Y, and 13 from Generation X) using a five-point Likert scale across four dimensions. Results indicated that Individual Risk Appreciation (Mean: 2.28 – Low) was critically deficient, with 60% of workers unable to visualize JSA/DSB instructions into concrete actions (Mean: 2.42). Assertiveness and Seniority scored comparably low (Mean: 2.32 – Low), with comfort in reprimanding senior peers for non-compliance recording the lowest score across all indicators (Mean: 2.08 – Very Low). Feedback Loop registered at a moderate level (Mean: 2.74). Most critically, the Operational Pressure/Service Excellence dimension recorded the highest and most concerning mean (Mean: 3.88 – High), with workers believing client satisfaction may override safety procedures (Mean: 3.96) and ad-hoc tasks frequently being executed without JSA revision (Mean: 3.78). The complete distribution is presented in Table 3.

Table 3
Questionnaire Response Distribution – Risk Communication Perception (N=100)

No	Indicator / Statement	STS (1)	TS (2)	N (3)	S (4)	SS (5)	Mean	Category
A	**INDIVIDUAL RISK APPRECIATION (ELM Aspect)**						**2.28**	**Low**
1	Understanding fatal hazards without supervisor re-explanation	25	40	20	10	5	2.30	Low
2	JSA/DSB instructions are easy to visualize into concrete actions	18	42	25	10	5	2.42	Low
3	LOTO/CSE procedures are too complex, leading to reliance on senior verbal instructions*	5	12	15	45	23	3.69	High*
B	**ASSERTIVENESS & SENIORITY (Psychological Aspect)**						**2.32**	**Low**
1	Comfortable reprimanding senior peers who are not wearing PPE	35	38	15	8	4	2.08	Very Low
2	Confident to stop hazardous work when client instructions are dangerous (SWA)	30	32	22	10	6	2.30	Low
3	Feel reluctant to refuse client requests outside SOW*	3	7	12	48	30	3.95	High*
C	**FEEDBACK LOOP & CONFIRMATION (Barnlund Aspect)**						**2.74**	**Moderate**
1	Always re-state risk instructions to supervisor before starting work	22	35	25	12	6	2.45	Low

2	Supervisor always asks about challenges at the end of morning briefing	10	15	30	35	10	3.20	Moderate
3	Active two-way discussion occurs during hazard identification	18	32	28	15	7	2.61	Low
D	**OPERATIONAL PRESSURE (Service Excellence)**						**3.88**	**High**
1	Client satisfaction is the top priority over procedural compliance*	4	6	15	40	35	3.96	High*
2	Ad-hoc tasks are executed without JSA revision or HSE confirmation*	5	8	18	42	27	3.78	High*

**High scores on asterisked indicators are negative, reflecting dominant barriers or risk-prone behaviors.*

2. Discussion

Root Causes of Risk Communication Failure and Theoretical Relevance

Empirical findings confirm that the persistence of fatalities at PT XYZ is not attributable to the absence of formal regulations, but rather to three mutually reinforcing layers of communication barriers. First, cognitive barriers: low Personal Appreciation of Risk (SCI 2024 score: 5.0 out of 100) causes workers to process safety instructions solely through the peripheral route within the Elaboration Likelihood Model framework—complying administratively without internalizing the meaning of hazards. This is consistent with questionnaire data (Mean: 2.42), where 60% of workers were unable to convert JSA text into mental representations of actual physical hazards.

Second, psychosocial barriers in the form of Safety Silence, triggered by high Power Distance in Indonesian culture (Hofstede, 2011). The low score for comfort in reprimanding senior peers (Mean: 2.08 – Very Low) validates that social hierarchy suppresses horizontal peer monitoring, consistent with Morrison & Milliken (2000), who assert that Safety Silence arises from fear of social consequences. Third, Role Conflict between the 'Good People' identity and safe work practitioner distorts the decoding of SWA messages (Mean for client satisfaction over procedures: 3.96), reflecting transactional failure in Barnlund's (1970) model, wherein message meaning fails to be mutually aligned between communicator and receiver.

Construction and Effectiveness of the S-C-F Model

The S-C-F Model (Standardization, Confidence, Feedback Loop) was designed as a direct response to these three communication barrier layers. The Standardization pillar transforms textual instructions into concrete visual guidance through: (1) a Visual SOW Card—defining safe work boundaries graphically to function as an instant Role Conflict resolver when clients issue out-of-scope instructions; (2) Hazard Code Standardization—visual symbols at critical points to accelerate Situation Awareness (Endsley, 1995) without dependence on lengthy verbal instructions; and (3) Scripting—standardized verbal scripts on the reverse of ID cards equipping workers with professional phrases to tactically defer hazardous tasks.

The Confidence pillar addresses psychosocial barriers through the formalization of Stop Work Authority (SWA) as a constitutionally protected corporate right, scenario-based assertiveness training, and the DESC Technique (Describe, Express, Specify, Consequences)—a standardized communication formula that provides linguistic certainty when engaging with external clients. This pillar directly responds to the lowest assertiveness scores (Mean: 2.08–2.30) by providing a legally sanctioned structural shield.

The Feedback Loop pillar mandates two-way communication through a Verbal Re-State Protocol before work permits are activated, transformation of Daily Safety Briefings (DSB) into interactive Double-Loop Feedback forums, and instant reporting mechanisms for non-routine work deviations via the corporate WhatsApp Group to create an auditable digital footprint. All three pillars operate in a sequential workflow: Standard (deviation detection via Visual SOW Card) → Confidence (safe deferral articulation via DESC and SWA) → Feedback (structural escalation and new JSA validation before work resumes). The S-C-F Model integration flow is presented in Figure 1.

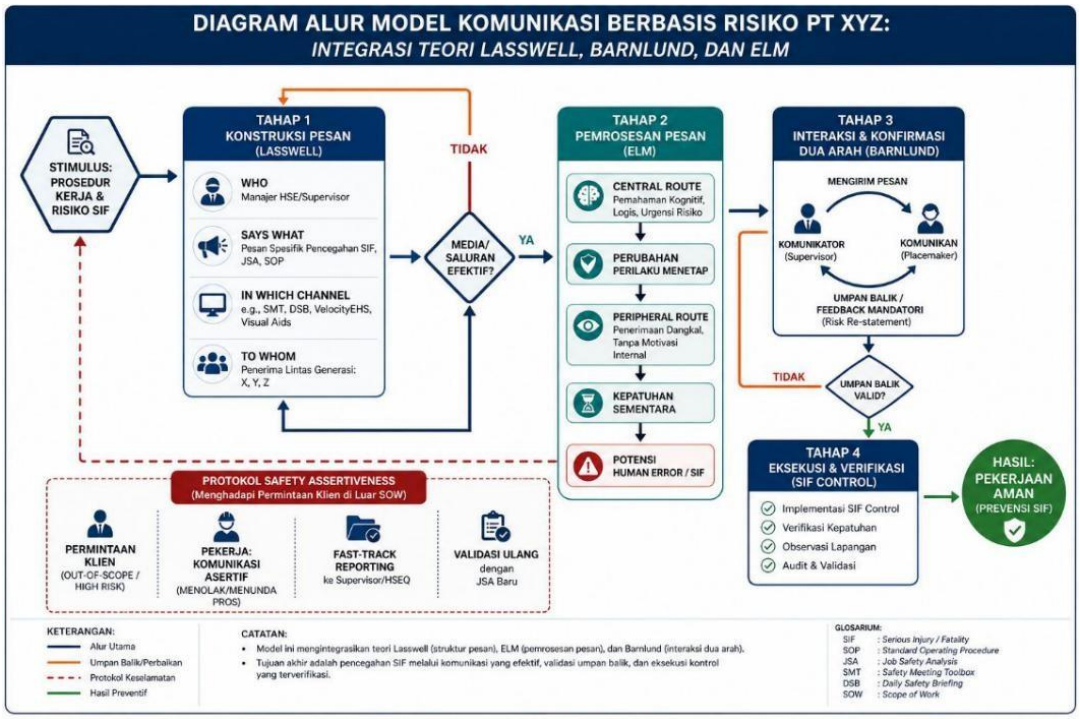

Figure 1. Flow diagram of the S-C-F Risk-Based Communication Model at PT XYZ

That the S-C-F Model at this stage constitutes a conceptual-operational framework that has been validated for feasibility, not a model whose effectiveness in reducing actual SIF incidents or unsafe behaviors has been empirically demonstrated. The expert judgment process confirmed that the model is theoretically sound, operationally applicable, and contextually relevant; however, feasibility validation is distinct from effectiveness evidence. The model has not yet been subjected to a controlled implementation study with pre- and post-measurement of safety outcomes such as unsafe act frequency, near-miss reporting rates, Stop Work Authority activation, or SIF precursor incidents. This distinction is critical and represents the primary limitation of the current study. The S-C-F Model should therefore be understood as a theoretically grounded intervention design that is ready for implementation testing, rather than an intervention with proven impact on safety performance

Cross-Generational Adaptation in Model Implementation

The effectiveness of the S-C-F Model is highly dependent on its adaptability to the multi-generational demographic reality of PT XYZ. Generation Z (67% of the workforce), as the primary target of the Standardization pillar, receives visual instruments and pictographic Hazard Codes that bypass the fatigue associated with conventional text-heavy documents; the formalization of SWA and DESC scripting under the Confidence pillar liberates them from the psychological constraints of seniority culture. Generation Y (predominantly occupying supervisor and HSE team positions) is positioned as the driving force of the Feedback pillar—trained to abandon authoritative leadership styles and instead act as dialogic facilitators in DSB sessions, bridging communication between management and frontline workers. Generation X is placed as validators in closed-loop communication, where their technical expertise serves as an asset during final confirmation prior to permit signing. Through this role differentiation, demographic diversity that previously constituted a communication challenge is transformed into a collective organizational strength.

Expert Validation of Model Feasibility

The S-C-F Model was validated through Expert Judgment involving the HSEQ Manager of PT XYZ, the Operations Manager of PT XYZ, and an OSH Academic, using a four-point Likert scale. The consolidated results are presented in Table 4.

Table 4
Expert Validation Score Summary of the S-C-F Model

No	Assessment Parameter	Expert 1 (HSEQ)	Expert 2 (Ops)	Expert 3 (Academic)	Mean Score	Category
1	Relevance: Model addresses the root cause of fatality incidents	4	4	4	4.0	Highly Feasible
2	Applicability: Ease of using SOW/SWA cards at work sites	3	4	3	3.3	Feasible
3	Effectiveness: Potential of Confidence pillar to break 'reluctance' culture	4	3	4	3.7	Highly Feasible
4	Feedback Loop: WhatsApp-based call-back mechanism as a substitute for physical supervision	4	4	3	3.7	Highly Feasible
5	Language & Visuals: Clarity of assertive scripts and card icons	3	4	4	3.7	Highly Feasible
TOTAL AVERAGE SCORE					**3.68**	**Highly Feasible**

The S-C-F Model achieved a cumulative average score of 3.68 (Highly Feasible). The Relevance parameter received the highest score (4.0), as the model was unanimously assessed as precisely targeting the sociopsychological barriers and transactional failures that underpin SIF incidents. The Applicability parameter (3.3) received a critical recommendation to enhance the color contrast of the SOW Card to a red-green scheme to ensure readability in low-light environments such as ceiling spaces—referencing the conditions of the previous fatality site. The remaining three parameters (each scoring 3.7) received recommendations for embedding written management endorsement statements on the reverse of SWA cards as corporate legal protection, and for utilizing an official WhatsApp Group as the Call-back medium to generate an auditable digital trail. Confirm that the S-C-F Model is theoretically robust and operationally applicable within PT XYZ's

labor-intensive, multi-generational, and decentralized work environment. Nevertheless, it must be explicitly stated that a feasibility score of 3.68 reflects expert consensus on the model's design quality and contextual fit—not empirical evidence of its effectiveness in reducing unsafe behavior or SIF incidents in practice. The next essential step is a prospective implementation study that measures behavioral outcomes before and after model deployment, including indicators such as SWA activation frequency, near-miss reporting rates, JSA compliance, and SIF precursor trends. Without this evidence, the projection that the model will bridge the safety culture gap identified in the Safety Culture Index 2024—where high personal commitment (89.4) coexists with critically low individual risk appreciation (5.0) and a Production/Safety Trade-off score of 34.7—remains a theoretically grounded hypothesis rather than a demonstrated outcome

Conclusion

The persistence of serious injuries and fatalities (SIF) at PT XYZ is not attributable to the absence of formal regulations, but rather to three mutually reinforcing layers of risk communication barriers: cognitive barriers reflected in low Personal Appreciation of Risk (SCI score: 5.0); psychosocial barriers in the form of Safety Silence driven by high Power Distance in Indonesian workplace culture (assertiveness Mean: 2.08 – Very Low); and Role Conflict between the identity of a responsive service provider and adherence to safety procedures (Mean: 3.95 – High). These conditions are compounded by the dominance of Generation Z at 67% of the workforce—a cohort with distinct cognitive characteristics confronting a safety communication system that remains predominantly linear, text-based, and unidirectional.

In response to these gaps, this study produced the S-C-F Risk Communication Model (Standardization, Confidence, Feedback Loop), integrating the Lasswell Linear Model, Barnlund's Transactional Model, and the Elaboration Likelihood Model (ELM) into a single cross-generationally adaptive cognitive protection system. The Standardization pillar transforms administrative instructions into concrete visual guidance through the Visual SOW Card, pictographic Hazard Codes, and assertive Scripting; the Confidence pillar builds workers' psychological protection through the formalization of Stop Work Authority and the DESC Technique; while the Feedback Loop pillar mandates two-way confirmation through the Verbal Re-State Protocol and instant deviation reporting via digital platforms.

The S-C-F Model was validated through Expert Judgment involving the HSEQ Manager, Operations Manager, and an OSH Academic, achieving a mean score of 3.68 out of 4.0 (Highly Feasible category). This outcome confirms that the model is not only scientifically sound but also applicable for implementation in labor-intensive, multi-generational, and decentralized work environments such as PT XYZ. The principal contribution of this study lies in addressing a gap in OSH communication literature by developing a risk communication model that explicitly integrates cross-generational cognitive characteristics—particularly those of Generation Z—as a central variable in the design of SIF prevention systems within large-scale facility management industries in Indonesia

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