Gatekeepers Under Pressure: A Comparative Analysis of Commissioning, HSE, and QA/QC Engineers in Engineering Project Delivery

Jennifer R. Ayres[1a], Ian May[b], Rosmina Bustami [2a], Jethro H Adam[a], Sithara H.P.W. Gamage [3c]

[a]UNIMAS Water Centre (UWC) Faculty of Engineering, Universiti Malaysia Sarawak, Kota Samarahan, 94300, Malaysia; [b]Cranfield University, College Rd, Cranfield, Wharley End, Bedford, United Kingdom, MK43 0AL; [c]Adelaide University, Mawson Lakes Blvd, SA 5095, Australia.

ORCID IDs: [1] 0000-0002-4538-6512 | [2] 0000-0002-8438-8932 | [3] 0000-0001-9209-911

Abstract

Engineering projects depend on gatekeeper roles — Commissioning/start-up engineers, Health, Safety, and Environment (HSE) professionals, and Quality Assurance/Quality Control (QA/QC) engineers — whose functions are to enforce standards at the point of delivery. Despite their shared assurance mandate, these roles differ markedly in structural pressures, enforcement confidence, safety exposure, and workforce composition. This paper presents, to our knowledge, one of the first comparative analyses of all three gatekeeper roles within a single dataset, drawing on a global cross-sectional survey of engineering professionals (N = 335, 22 countries across six continents). A central finding concerns the daily enforcement experience of HSE professionals: 63% report frequent pushback when raising safety concerns, 58% report risk assessments being rushed or completed superficially, and 32% report pressure to accept higher safety risk than they deemed appropriate — all significantly higher than QA/QC counterparts, with medium to large effect sizes.

The credential-enforcement gap offers a plausible structural explanation. Fifty-eight per cent of HSE professionals hold sub-degree vocational qualifications, compared with 5% of commissioning engineers and 10% of QA/QC engineers ($\chi^2(2) = 35.836$, $p < .001$). This places the role with the highest physical safety enforcement responsibility at the lowest position in the credential hierarchy, potentially reducing the symbolic authority available in enforcement interactions. Additional findings include commissioning engineers reporting the highest structural pressure and lowest hesitation to challenge; QA/QC engineers reporting a supportive culture yet paradoxically the highest hesitation to challenge; and HSE professionals showing concerning departure intentions despite high job satisfaction — consistent with role conflict theory. We introduce the concept of the credential-enforcement gap and discuss its implications for safety governance and organisational design.

***Keywords**:* Gatekeeper roles; commissioning engineering; HSE; quality assurance; enforcement under pressure; credential asymmetry; safety voice; organisational status; engineering culture; workforce attrition

1. Introduction

Engineering project delivery depends critically on a class of professionals whose primary function is not to build but to verify, enforce, and assure. Commissioning engineers integrate and test complex engineered systems before handover. Health, Safety and Environment (HSE) professionals monitor and enforce safe work practices on site. Quality Assurance and Quality Control (QA/QC) engineers verify that outputs meet specified standards throughout the delivery process. Despite their distinct technical domains, these three roles share a fundamental structural characteristic: they are positioned at the boundary between production pressure and quality or safety enforcement, and their function is to ensure that the project does not proceed until it is safe and compliant to do so.

This enforcement function places gatekeeper roles in a structurally uncomfortable position. They operate within organisations whose primary incentive structure rewards speed of delivery rather than the rigour of assurance. Their authority to stop, delay, or reject work is formally sanctioned but informally resisted. Prior research has documented elements of this tension within individual roles: commissioning engineers face schedule compression, documentation pressure, and systematic recognition deficits (Davies and Mackenzie, 2014; Merrow, 2011): HSE professionals encounter resistance to safety interventions and role marginalisation (Frick, 2011; Gallagher et al., 2003); QA/QC engineers report difficulty enforcing non-conformance processes in contractor-dominated environments (Arditi and Gunaydin, 1997). What has not previously been examined is whether these three roles share a common structural experience and how they differ in the form and severity of the pressures they face.

This paper addresses that gap using a global survey dataset (N = 335) (Ayres et al., 2026b). In doing so, it surfaces two findings with significant implications for safety governance. The first aligns with patterns identified in the safety management literature, in which organisations tend to staff safety enforcement roles at lower credential and remuneration levels than equivalent technical roles. The second extends this evidence: HSE professionals in the present sample report substantially higher safety enforcement resistance than their QA/QC counterparts — higher rates of pushback when raising safety concerns, rushed or superficial risk assessments, and pressure to accept greater risk than is appropriate. The credential-enforcement gap, this paper argues, is not simply a credentialing anomaly. The present data suggest it may have measurable operational consequences.

We ask four questions. First, do commissioning, HSE, and QA/QC engineers share common patterns of pressure and marginalisation relative to non-gatekeeper engineering roles? Second, how do the three roles differ in pressure type, severity, culture, and enforcement confidence? Third, what do the safety enforcement pressure data reveal about the operational consequences of credential asymmetry for HSE professionals specifically? Fourth, what does the credential and remuneration profile of each role reveal about the structural basis of enforcement authority and its implications for safety governance?

2. Literature Review

2.1 Gatekeeper Roles in Engineering: A Functional Definition

The concept of gatekeeping in organisations was developed in knowledge management and information flow research (Allen, 2007; Tushman and Katz, 1980), where gatekeepers control the flow of information between internal and external environments. In engineering project delivery, the term applies to roles whose function is to control the quality and safety of

outputs at defined verification points — to prevent defective, unsafe, or non-compliant work from advancing to the next project phase.

Commissioning engineers perform this function at the system integration level, verifying that engineered systems function as designed before handover (IET, 2021). HSE professionals perform it at the work execution level, with authority to issue and withdraw permits to work, stop unsafe work, and enforce procedural compliance (HSE, 2013). QA/QC engineers perform it at the output verification level through non-conformance processes, inspection and test plans, and hold points. What unites these roles is structural position: each holds formal authority to withhold approval in an environment where commercial and schedule interests create pressure to proceed.

2.2 Credentials, Occupational Status, and Enforcement Authority

The sociology of professions establishes that formal credentials serve as a basis for occupational authority — they legitimate claims to specialised knowledge and the right to make judgments that others must accept (Abbott, 1988; Freidson, 2001). In hierarchically organised workplaces, credential differences between roles translate into status differences that affect whose judgments are treated as authoritative and whose challenges are taken seriously. This dynamic is independent of actual competence: an individual may hold deep specialist expertise through vocational training and professional certification without commanding the same interactional authority as a degree-qualified counterpart in the same workplace.

The credential-enforcement gap described in this paper refers to the mismatch between the formal qualification level and the enforcement function. It operates through what Bourdieu (1984) termed symbolic capital: the socially recognised attributes — credentials, titles, institutional affiliation — that confer authority in social interactions. Where an enforcement role is staffed predominantly by vocationally qualified professionals operating within a degree-dominated technical workforce, the symbolic capital available to the enforcer is structurally reduced relative to that of the enforced. This has been documented in nursing (Porter, 1991), social work (Carey, 2008), and occupational health (Quinlan et al., 2001), but has received little systematic attention in engineering contexts.

2.3 Safety Voice and Enforcement Resistance

Safety voice — the willingness to speak up about safety concerns in high-stakes work environments — has been extensively studied in healthcare, aviation, and nuclear power (Edmondson, 1999; Leape, 2009; Tucker et al., 2008). Research consistently shows that hierarchical authority structures, time pressure, and fear of negative reactions suppress safety voice, with consequences for system reliability and incident rates. Engineering project delivery shares these characteristics: commissioning and HSE work take place in time-compressed, hierarchically organised environments where raising safety concerns incurs social and commercial costs.

The epistemic injustice framework (Fricker, 2007) provides a complementary account. Epistemic injustice occurs when a speaker's testimony is given less credibility than it merits because of characteristics that generate social prejudice. In engineering workplaces, credential level functions as a credibility signal: the HSE professional whose objection is overridden by a degree-qualified engineer is experiencing a form of epistemic injustice rooted

in the credential hierarchy, not in the quality of the safety concern raised. The present paper provides new empirical evidence of these dynamics across engineering gatekeeper roles.

2.4 Remuneration, Role Conflict, and Workforce Sustainability

The HSE Recruitment Network's 2025 Remuneration Report (n ≈ 2,500; predominantly UK-based) indicates that entry-level HSE advisor salaries have increased in recent years, broadly aligning with the mid-£30,000 to low-£40,000 range observed across UK benchmarks. However, salary growth in 2025 is reported at approximately 3%, a marked reduction compared to previous years, suggesting limited real-term improvement under current inflationary conditions. The report also highlights widespread dissatisfaction with remuneration, with a substantial proportion of respondents indicating they do not feel compensated.

Role conflict theory (Kahn et al., 1964) predicts that individuals serving incompatible organisational demands will experience elevated stress and departure intentions. Gatekeeper roles face an endemic conflict between delivery accountability and assurance obligations. Boundary spanning theory (Tushman and Scanlan, 1981) adds that roles positioned between organisational subsystems bear exposure to demands from both sides without the protection of either. For HSE professionals, this burden is compounded by the documented asymmetry in credentials and remuneration documented in this paper. Vaughan's (1996) normalisation of deviance is directly relevant: where enforcement professionals lack the status-based authority to sustain objections against technically confident engineers, the incremental acceptance of marginal non-compliance may cumulatively degrade the safety standard the enforcement function is designed to maintain (Dekker, 2011).

3. Method

3.1 Study Design

Data were drawn from a global cross-sectional survey of engineering professionals conducted between January and February 2026 (N = 335) across 22 countries across six continents. Survey methodology, sampling strategy, and full descriptive statistics are documented in the anchor paper for this dataset (Ayres et al., 2026b). The survey was administered to a broad cross-section of engineering professionals, with no role-based inclusion or exclusion criteria applied during recruitment. The resulting sample includes commissioning/start-up engineers (n = 81, 24% of the sample), QA/QC engineers (n = 20), and HSE professionals (n = 19), alongside respondents from other engineering functions. Because the three gatekeeper roles differ substantially in subsample size, all cross-role comparisons must be interpreted with this imbalance explicitly in mind; findings for HSE and QA/QC subgroups, while statistically significant where reported, rest on small samples and should be treated as indicative rather than definitive. Ethical approval was obtained through the University of Malaysia; all participants provided informed consent.

3.2 Measures

All respondents completed seven universal pressure items and four organisational culture items on five-point Likert agreement scales (1 = Strongly disagree to 5 = Strongly agree). HSE and QA/QC respondents additionally completed a seven-item safety enforcement pressure module (five-point frequency scale: 1 = Never to 5 = Very often) covering: pressure to sign off before safety prerequisites were fully met; experience of risk assessments being rushed or superficial; pressure to accept higher risk due to project pressure; pushback or

resistance when raising safety concerns; schedule pressure influencing safety decisions; senior stakeholders bypassing safety processes; and frequency of HSE inclusion early enough in project planning. Commissioning engineers completed a separate seven-item commissioning-specific module, three items from which capture permit and safety bypass behaviour. Gender was operationalised as a binary variable (man/woman); respondents selecting 'prefer not to say' were excluded from gender-stratified analyses. Educational qualifications were classified as sub-degree or degree-level or above, consistent with the Australian Qualifications Framework and the UK Qualifications and Credit Framework conventions.

3.3 Analytical Approach

Descriptive statistics are reported for each gatekeeper role. Kruskal-Wallis tests with post-hoc Mann-Whitney U comparisons (Bonferroni-corrected $\alpha = .017$ for three pairwise comparisons) examined differences across roles on Likert items. Chi-square and Fisher's exact tests were used to examine categorical distributions. Mann-Whitney U tests compared the combined gatekeeper pool ($n = 120$) with non-gatekeeper respondents ($n = 215$) and compared men and women within the combined gatekeeper sample. Cramér's V and rank-biserial r are reported as effect size measures throughout. All tests used $\alpha = .05$. Given the small HSE and QA/QC subsamples, all inferential results for these groups are treated as preliminary and are flagged accordingly.

4. Results

4.1 Sample Composition and Role Representation

The three gatekeeper roles are unequally represented in the sample, a direct consequence of the survey's primary commissioning focus. Commissioning engineers ($n = 81$) constitute 24% of the total sample, while HSE ($n = 19$, 6%) and QA/QC ($n = 20$, 6%) are represented at approximately one-quarter the commissioning sample size. The combined gatekeeper pool ($n = 120$) represents 36% of the full sample. The gender composition of the combined gatekeeper sample is 82 men (68%) and 37 women (31%), with one respondent preferring not to state gender.

4.2 Educational Qualification Profiles

Table 1 presents the distribution of educational qualifications across the three gatekeeper roles. The profiles differ substantially and significantly.

Table 1. Educational qualifications by gatekeeper role.

Qualification	Cx n	Cx %	HSE n	HSE %	QA n	QA %	Full sample %
PhD / Doctorate	1	1%	0	0%	0	0%	1%
Master's degree	21	26%	1	5%	5	25%	20%
Bachelor's degree	55	68%	7	37%	13	65%	54%
Diploma / Associate degree	2	2%	10	53%	2	10%	17%
High school / secondary	2	2%	1	5%	0	0%	7%
Sub-degree total	**4**	**5%**	**11**	**58%**	**2**	**10%**	**25%**
Degree+ total	**77**	**95%**	**8**	**42%**	**18**	**90%**	**75%**

Note. Cx = Commissioning/Start-up (n = 81); HSE (n = 19); QA = QA/QC (n = 20). Sub-degree = Diploma/Associate degree or High school/secondary. Degree+ = Bachelor, Master, PhD, Graduate Diploma. $\chi^2(2) = 35.836$, $p < .001$. Fisher's exact: HSE vs Cx OR = 26.47, $p < .001$; HSE vs QA/QC, $p = .002$.

Fifty-eight per cent of HSE professionals hold sub-degree vocational qualifications — primarily diploma or associate degree level — compared with 5% of commissioning engineers and 10% of QA/QC engineers. The three-way chi-square is highly significant ($\chi^2(2) = 35.836$, $p < .001$), and pairwise Fisher's exact tests confirm that HSE is significantly more likely to be sub-degree qualified than both commissioning (OR = 26.47, $p < .001$) and QA/QC ($p = .002$). The full-sample sub-degree rate is 25%, meaning HSE's 58% figure is more than double the survey-wide baseline.

It is essential to interpret this finding carefully. Sub-degree qualifications in health and safety contexts typically accompany specialist professional certifications — the National Examination Board in Occupational Safety and Health (NEBOSH), membership of the Institution of Occupational Safety and Health (IOSH), the Certificate IV in Work Health and Safety, and international equivalents — that represent rigorous, purpose-designed expertise in risk management and regulatory compliance. The credential profile documented here does not reflect a competence gap in HSE professionals. It reflects an organisational staffing pattern in which safety enforcement is routinely filled at a lower academic credential level than technical engineering roles, with consequences for the occupational status and symbolic authority available to HSE professionals in hierarchically organised engineering environments.

4.3 The Shared Gatekeeper Condition

The combined gatekeeper pool (n = 120) differs from non-gatekeeper engineers on two consistent dimensions. Role expansion pressure is significantly higher in gatekeeper roles (M = 4.07 vs 3.45, $p < .001$, $r = -.290$): the scope of gatekeeper work routinely exceeds its formal definition. Communication culture is significantly worse (M = 2.65 vs 3.25, $p < .001$, $r = .294$): all three gatekeeper roles operate in poorer communication environments than their non-gatekeeper colleagues. Paradoxically, gatekeepers show lower hesitation to challenge than non-gatekeepers overall (M = 2.48 vs 2.97, $p < .001$, $r = .242$), confirming that enforcement intent as a group characteristic is not suppressed relative to the broader workforce — though role-level analysis reveals important within-group variation.

4.4 Role-Level Pressure and Culture Profiles

Table 2 presents means and percentage agreement across all key variables by role. The pressure and culture profiles are distinct across the three roles.

Table 2. Descriptive statistics by gatekeeper role: pressure, culture, and enforcement outcomes.

Variable	Cx M	Cx %	HSE M	HSE %	QA M	QA %	KW p
PRESSURE							
Hours pressure	**4.30**	**86%**	3.68	68%	3.10	40%	< .001
Workload expectations	3.69	72%	3.74	84%	3.30	45%	.042
Role boundary expansion	4.14	81%	4.26	89%	3.60	65%	.044
Fear of judgment	3.10	33%	3.32	47%	3.40	50%	.333
CULTURE							
Leadership support	2.99	31%	3.47	47%	**3.75**	**65%**	< .001
Communication openness	2.36	16%	3.16	37%	3.35	45%	< .001
Encouragement of autonomy	2.99	25%	3.63	63%	**3.65**	**60%**	< .001
ENFORCEMENT & BEHAVIOUR							
Hesitate to challenge	**2.32**	**17%**	2.53	32%	3.05	40%	.023
PSYCHOLOGICAL							
Overwhelmed	3.37	47%	3.53	58%	3.10	30%	.223
Anxiety	3.31	46%	3.58	63%	3.35	50%	.382

***Note** Bold indicates highest value per row; italics indicate lowest (for pressure items, lowest is least pressured; for culture items, lowest is least supportive). Cx = Commissioning/Start-up (n = 81); HSE (n = 19); QA = QA/QC (n = 20). % = proportion rating ≥ 4 (agree/often or above). KW p = Kruskal-Wallis significance across three roles. Cx n is 4× HSE and QA n; interpret comparative findings accordingly.*

Commissioning engineers report the highest hours pressure (M = 4.30; 86%), significantly higher than both QA/QC ($p < .001$, $r = -.636$) and HSE ($p = .016$, $r = -.331$). Role expansion pressure is uniformly high across all three roles with no significant pairwise differences after Bonferroni correction, confirming scope overreach as a shared gatekeeper experience. Culture profiles diverge consistently: commissioning reports the worst organisational culture across all four items, QA/QC the best. The communication openness gap between commissioning (M = 2.36, 16%) and QA/QC (M = 3.35, 45%) is nearly a full-scale point and is practically as well as statistically significant.

4.5 Safety Enforcement Pressure: HSE and QA/QC Compared

Table 3 presents safety enforcement pressure data for HSE and QA/QC roles, supplemented by commissioning permit and bypass items. These data directly address the operational consequences of the credential-enforcement gap documented in Section 4.2.

Table 3. Safety enforcement pressure items by the gatekeeper role.

Safety enforcement item	HSE M (n=19)	HSE often+ %	QA/QC M (n≈18)	QA/QC often+ %	p (MW)
Pushback/resistance when raising safety concerns	**3.89**	**63%**	3.06	28%	.020 *
Risk assessments rushed or completed superficially	**3.53**	**58%**	2.47	6%	.002 **
Schedule pressure influences safety decisions	**3.63**	**37%**	3.15	30%	.149 ns
Pressure to accept higher risk (project pressure)	**3.16**	**32%**	2.41	0%	.013 *
Sign off before safety prerequisites fully met	2.68	11%	2.35	0%	.233 ns
Senior stakeholders bypassed safety processes	2.47	11%	2.60	15%	.678 ns
HSE included early enough in project planning	3.00	21%	2.74	16%	.401 ns
COMMISSIONING — permit and safety bypass items					
Informal work before permits/risk assessments in place (Cx only)	*M = 3.33*	*35.8% (29/81)*	—	—	—
Pressure to bypass/fast-track permit or isolation (Cx only)	*M = 2.64*	*14.8% (12/81)*	—	—	—

Note. HSE and QA/QC responded to the shared enforcement module (cols 57–63); commissioning responded to a role-specific module (cols 25, 26, 30). Mann-Whitney U tests compare HSE and QA/QC on shared items. Effect sizes (r): small = .10–.29, medium = .30–.49, large ≥ .50. * p < .05; ** p < .01; ns = not significant. HSE n = 19; QA/QC n varies 17–20 due to 'not applicable' responses. All findings for these subgroups are preliminary given sample size.

The pattern is striking and consistent. HSE professionals report substantially higher safety enforcement resistance than QA/QC engineers on the three items that most directly operationalise enforcement pushback. Sixty-three per cent of HSE professionals report often or very often experiencing pushback or resistance when raising safety concerns (M = 3.89), compared with 28% of QA/QC engineers (M = 3.06; p = .020, r = .433, medium effect).

Fifty-eight per cent of HSE professionals report risk assessments being rushed or completed superficially at least often (M = 3.53), compared with 6% of QA/QC engineers (M = 2.47; p = .002, r = .591, large effect). Thirty-two per cent of HSE professionals report pressure to accept higher safety risk than they deemed appropriate (M = 3.16), compared with 0% of QA/QC engineers (M = 2.41; p = .013, r = .452, medium effect).

Schedule pressure influencing safety decisions is high in both roles — 100% of HSE professionals report this at least sometimes, as do 100% of QA/QC engineers — though the HSE mean is higher (3.63 vs 3.15). The absence of significant differences in senior stakeholder bypass and sign-off under pressure items suggests that the most distinctive HSE experience is not the existence of safety-compromise pressure per se, but the resistance they encounter when they attempt to enforce against it.

The open-text responses from HSE professionals provide practitioner language that grounds these statistics directly:

> *"The pressure to not do full safety inspections and slow down work is everyday, the anger by construction crews outweighs my job role and I am struggling and looking for a less pressured job."*

"I am often pressured to speed up the safety process but there are regulations I have to work to."

"It's the pushback from subcontractors that causes the issues and stress — it's never ending."

These findings are reinforced by open-text responses from the same survey, reported in full in the qualitative companion paper (Ayres et al., 2026a). The responses describe enforcement resistance as a structural, chronic feature of HSE work — not an episodic or exceptional experience. The commissioning permit data provide contextual comparison: 35.8% of commissioning engineers report informal work proceeding before permits or risk assessments are in place at least often (M = 3.33), with 14.8% reporting direct pressure to bypass or fast-track permit/isolation steps (M = 2.64). Commissioning engineers are therefore not immune to safety process pressure, but they experience it differently — as a documentation and sequencing failure (absorbed upstream) rather than as active resistance to their enforcement attempts.

4.6 The Gatekeeper Paradox: Best Supported, Most Hesitant

The most theoretically significant finding concerns the relationship between culture and enforcement confidence. QA/QC engineers report the best organisational culture across all four items yet exhibit the highest hesitation to challenge (M = 3.05; 40%), significantly higher than commissioning ($p = .004$, $r = .399$). Commissioning engineers, operating in the worst culture environment, show the lowest hesitation to challenge (17%). The Kruskal-Wallis test confirms a significant overall difference ($H(2) = 7.59$, $p = .023$).

Two mechanisms are proposed. First, embeddedness-mediated suppression: QA/QC professionals embedded in project teams over extended periods develop working relationships that create social costs for enforcement. The relational cost of raising a non-conformance against a colleague is ongoing in an embedded context while simultaneously generating the conditions for enforcement hesitation — a pattern consistent with research showing that silence can persist even in psychologically safe environments when relational costs are salient (Sherf et al., 2021); the supportive culture QA/QC engineers report may partly reflect these working relationships while simultaneously generating the conditions for enforcement hesitation. Second, adversarial identity formation in commissioning (Pratt et al., 2006): the low hesitation among commissioning engineers likely reflects a professional identity built around enforcement as a core function—an identity forged under adverse conditions and sustained without organisational validation.

4.7 Credential Asymmetry and HSE Enforcement Authority

The credential findings have direct implications for how HSE enforcement interactions play out in practice, and the safety enforcement data in Section 4.5 provide the operational confirmation. With 58% of HSE professionals holding sub-degree qualifications, these professionals are routinely enforcing safety standards against a workforce that is 95% degree-qualified in commissioning and 90% degree-qualified in QA/QC. This credential gap affects the collective interactional authority of HSE professionals, regardless of the specialist expertise of any individual officer.

The safety enforcement data are consistent with and make the pattern operationally visible. The large effect size for risk assessments rushed ($r = .591$) and the medium effect sizes for pushback ($r = .433$) and risk acceptance pressure ($r = .452$) indicate that HSE professionals

experience substantially greater resistance to their enforcement function than QA/QC counterparts — who operate in more supportive cultures, with higher credential parity relative to the workforce they monitor, and in roles where enforcement is embedded in documented hold-point and non-conformance processes. The HSE enforcement model, which depends more heavily on interpersonal authority and less on procedural embedding, appears more vulnerable to credential-based status resistance.

Industry remuneration data broadly support this interpretation. The HSE Recruitment Network's 2025 Remuneration Report indicates that entry-level HSE advisor salaries cluster within the mid-£30,000 to low-£40,000 range, consistent with wider UK benchmarks. The report also highlights widespread dissatisfaction with remuneration, with a substantial proportion of respondents indicating they do not feel compensated. Taken together with the credential requirements of these roles, this suggests that organisations may comparatively undervalue the HSE function relative to technical disciplines — a pattern that the enforcement resistance data indicate has tangible operational consequences (HSE Recruitment Network, 2025).

4.8 Workforce Sustainability and Departure Intentions

Figure 1 presents intention-to-leave data by gatekeeper role.

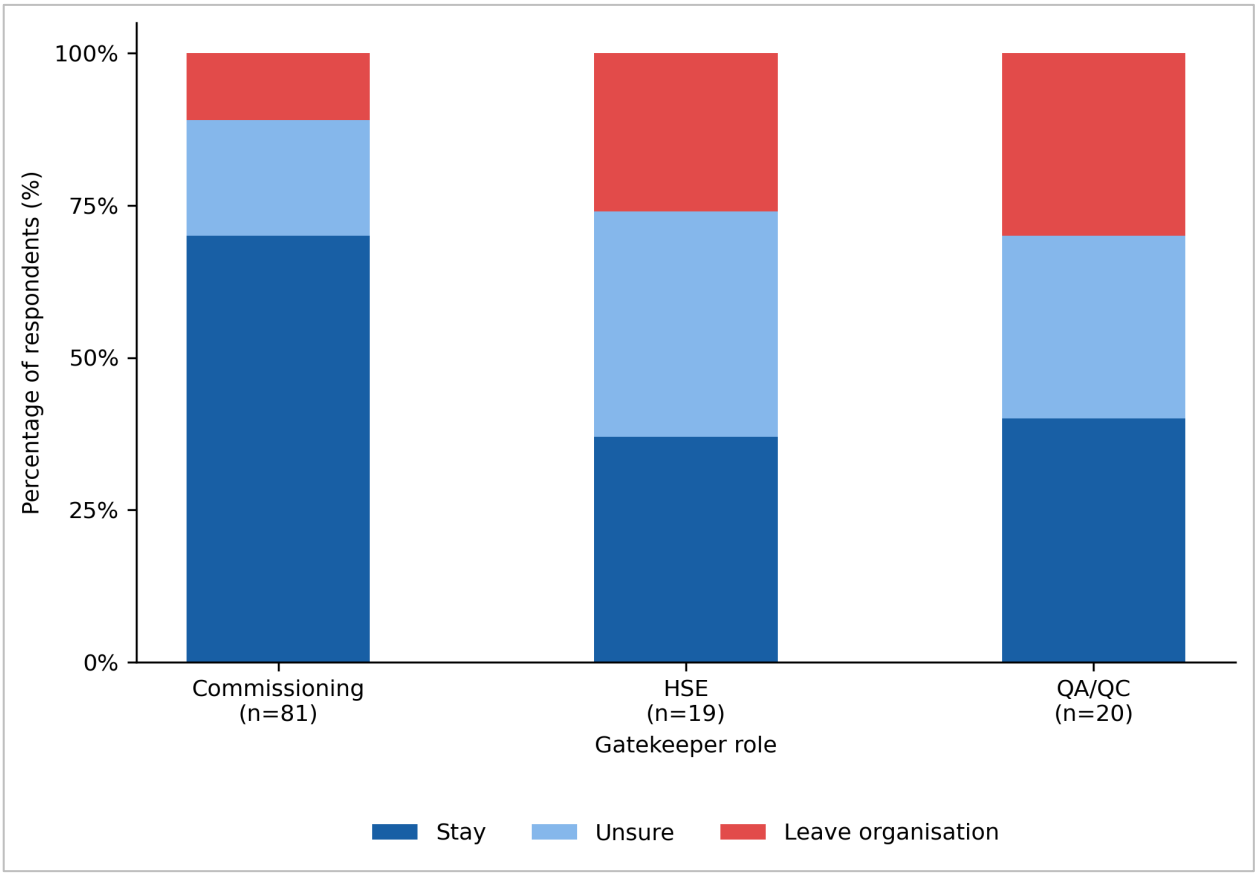

Figure 1. Organisational retention intent by gatekeeper role.

Stacked bars show the proportions of each role group who intend to stay, are unsure, or are actively considering leaving their organisation. Job satisfaction (satisfied or very satisfied) was 94% for commissioning, 84% for HSE, and 85% for QA/QC across all three groups — a

pattern consistent with role conflict theory rather than job dissatisfaction driving departure intent. Cx n = 81; HSE n = 19; QA/QC n = 20.

Seventy per cent of commissioning engineers intend to stay with their organisation; 94% intend to remain in engineering. By contrast, only 37% of HSE professionals and 40% of QA/QC engineers express clear organisational retention intent, and 26% of HSE professionals are considering leaving both their organisation and the engineering profession. These departure intentions are not driven by job dissatisfaction — 84% of HSE and 85% of QA/QC respondents report being satisfied or very satisfied with their work. This pattern — high satisfaction alongside strong departure intent — is consistent with job embeddedness theory and role conflict research (Kahn et al., 1964). Satisfaction does not reliably predict retention when structural conditions — credential disadvantage, enforcement resistance, boundary spanning burden — accumulate beyond a threshold of tolerability. Figure 1 illustrates the paradox: the satisfaction bars are broadly comparable across all three roles, while departure intent diverges sharply.

4.9 Gender and Organisational Culture

Within the combined gatekeeper sample (men n = 82, women n = 37), no significant gender differences were found on any safety enforcement pressure item. On organisational culture items, women report significantly more favourable perceptions than men (Table 4). This counterintuitive pattern is consistent with a survivorship interpretation: women who remain in gatekeeper roles may have self-selected into more supportive environments, while those in hostile environments have departed at higher rates (Cech and Blair-Loy, 2019; Fouad et al., 2017)— a sampling artefact that the cross-sectional design cannot fully resolve.

Table 4. Gender differences on organisational culture items: combined gatekeeper sample (commissioning, HSE, QA/QC; men n = 82, women n = 37). Mann-Whitney U tests.

Organisational culture item	Men M (n=82)	Women M (n=37)	p	r	Significance
Leadership in my organisation is supportive	3.06	**3.51**	.004	.313	**
Organisation encourages independence and initiative	3.11	**3.43**	.035	.225	*
Mistakes treated as learning opportunities	3.33	3.59	.054	.207	ns (trend)
Communication is open and transparent	2.55	2.89	.104	.179	ns

Note. * p < .05; ** p < .01; ns = not significant. r = rank-biserial correlation effect size (small = .10–.29, medium = .30–.49).

5. Discussion

5.1 The Credential-Enforcement Gap as an Organisational Design Problem

The central argument of this paper is that the credential and remuneration profile of HSE roles in engineering is not incidental but reflects an organisational investment logic (Evetts, 2011; Witz, 1992) — one that places lower formal qualifications, lower pay, and by extension lower occupational status at the enforcement interface with the highest physical safety consequences. The safety enforcement pressure data reported in Section 4.5 provide

the operational confirmation this argument previously lacked: HSE professionals face systematically greater enforcement resistance than QA/QC counterparts on the items that most directly operationalise the enforcement encounter. The credential gap is not merely a structural curiosity; it has measurable consequences for the daily work experience of the professionals who enforce safety on engineering projects.

The mechanism is consistent with Bourdieu's (1984) account of symbolic capital. When a diploma-qualified HSE officer exercises formal authority to stop work authorised by a degree-qualified project engineer or commissioning manager, the interaction takes place across a credential gap that engineering workplaces do not treat as irrelevant. The HSE professional's authority is formally legitimate but asymmetric in status. Over repeated interactions, this asymmetry creates conditions for the normalisation of deviance that Vaughan (1996) and Dekker (2011) describe— consistent with the broader finding that rule-following behaviour in safety contexts is shaped by organisational structure rather than individual compliance (Hale and Borys, 2013): — not through any single failure of enforcement, but through the accumulated pressure of asymmetric authority relationships that gradually shift what counts as acceptable practice.

An attempt was made to test whether sub-degree credential level independently predicted enforcement-related outcomes (hesitation to challenge, poor culture perceptions) using logistic regression across the full gatekeeper pool (N = 120), with role and gender as covariates. The analysis found that credential level did not independently predict any outcome after controlling for role (all $p > .09$). This null result is not evidence against the credential-enforcement gap argument; it reflects a structural feature of the data. Sub-degree qualification is so heavily concentrated within HSE (58% sub-degree) relative to commissioning (5%) and QA/QC (10%) that credential level and HSE role are near-collinear in this sample — they cannot be statistically separated. The credential gap is the HSE role gap: the two are structurally fused rather than independently varying. This is precisely what a Bourdieuian account would predict — credential disadvantage operates at the level of role and organisational position, not as an individual-level variable that varies independently within roles. Disentangling the two requires a substantially larger and more credential-diverse HSE sample than the present data afford.

5.2 Specialist Expertise and Structural Position

Occupational health and safety professionals in both Australia and the UK operate within well-developed professional frameworks. NEBOSH qualifications, IOSH chartered membership, and the Australian Institute of Health and Safety credentialling pathway represent specialist expertise that is purpose-designed, assessed to professional standards, and regulated by professional bodies. As Billett (2011) argues, vocational knowledge represents a distinct form of expertise rather than a deficit relative to academic credentials; the credential asymmetry documented here is not about whether HSE professionals know how to do their jobsThe credential asymmetry documented here is not about whether HSE professionals know how to do their jobs — it is about the structural position their jobs occupy within the engineering workplace hierarchy, and the authority dynamics that position generates.

This distinction matters practically. These findings suggest that the primary intervention may not be training or upskilling of HSE professionals, but a reappraisal of how organisations position, credential-require, and remunerate the safety enforcement function. One implication is that credential parity should be considered as a policy objective — not because vocational

qualifications are inferior to degrees, but because the status signals that credential levels send within engineering workplaces shape the authority dynamics of enforcement, and those dynamics now have empirical safety consequences.

5.3 The Gatekeeper Paradox and Commissioning Resilience

The QA/QC hesitation finding adds a dimension that the credential account alone cannot explain. Where HSE hesitation appears structurally driven by the authority deficit created by credential asymmetry and operationally confirmed by the enforcement resistance data, QA/QC hesitation appears relationally driven — a product of embeddedness in sustained project team relationships where enforcement carries a social cost. These are different mechanisms requiring different interventions: for HSE, structural investment in credential-based status and procedural backing; for QA/QC, procedural protections that reduce the relational cost of individual enforcement decisions — hold point independence, third-party verification, anonymous non-conformance reporting.

Commissioning's low hesitation to challenge, achieved against the worst culture of the three roles, suggests that professional identity functions as an independent enforcement resource. The adversarial conditions commissioning engineers describe — enforcing against schedule pressure, having technical authority contested, operating as the last line before handover — may produce an identity in which enforcement under pressure is constitutive of professional self-understanding. If so, this is a professional formation dynamic worth understanding across all three gatekeeper roles, not only commissioning.

5.4 Safety Enforcement Pressure and the Design of Safety Governance

The safety enforcement data reported in Section 4.5 have direct implications for how organisations should design safety governance structures. If 63% of HSE professionals experience pushback when raising safety concerns often or very often, and 100% experience schedule pressure influencing safety decisions at least sometimes, the problem is not individual assertiveness — it is structural. This aligns with the broader safety voice literature, which consistently finds that speaking up is shaped by organisational and relational factors rather than individual disposition (Noort et al., 2019). Safety governance systems that depend on interpersonal authority to function are vulnerable to the credential and status dynamics documented in this paper; systems that embed safety requirements in procedural gates, hold points, and contractual conditions are less vulnerable to resistance to individual enforcement.

The commissioning safety data provide a complementary perspective. Commissioning engineers experience safety pressure primarily as a documentation and sequencing failure — informal work proceeding before permits (35.8% often+), pressure to accept as-is equipment (74% often+) — rather than as active resistance to their enforcement attempts. This distinction reflects the different structural positions of the two enforcement functions: commissioning engineers are integrated into the production process and their safety authority is embedded in the commissioning sequence itself; HSE professionals operate as external enforcers whose authority depends more heavily on interpersonal credibility and organisational backing.

5.5 Practical Recommendations

The findings carry three practical implications for organisations that employ gatekeeper professionals. First, credential parity. Organisations should review whether HSE enforcement roles are consistently filled at a credential level commensurate with the technical workforce they are required to enforce against. This is not an argument that vocational qualifications are inferior — NEBOSH, IOSH, and equivalent professional certifications represent rigorous specialist expertise. It is an argument that credential signals shape authority dynamics in hierarchically organised workplaces, and that those dynamics now have measurable operational consequences. Where enforcement authority routinely encounters credential-based resistance, a structural response — raising minimum credential or professional registration requirements for HSE roles — is warranted alongside individual professional development.

Second, procedural embedding. Safety governance systems that depend on the interpersonal authority of individual HSE officers to function are structurally vulnerable to the credential and status dynamics documented here. Organisations should embed HSE authority in contractual hold points, mandatory sign-off gates, and permit-to-work structures that cannot be bypassed through informal pressure on individuals. This approach is consistent with established evidence that safety management effectiveness depends on organisational positioning and procedural authority rather than individual competence alone (Hale, 2003). The commissioning data support this: where safety authority is embedded in the commissioning sequence itself — rather than dependent on the personal authority of an external enforcer — the experience of direct enforcement resistance is qualitatively different. QA/QC engineers' use of documented hold points and non-conformance processes offers a partially transferable model for HSE governance design.

Third, remuneration alignment. The HSE Recruitment Network’s 2025 Remuneration Report documents that 68% of entry-level HSE professionals report not feeling fairly remunerated, and that salaries at all levels surveyed are not keeping pace with inflation. Where organisations pay less for safety enforcement than for comparable technical roles, they signal — structurally and symbolically — that safety enforcement is a lower-value organisational function. Addressing this signal requires pay benchmarking against engineering rather than administrative roles, and transparent career progression frameworks that reward HSE expertise with the seniority and compensation that enforcement authority requires.

5.6 Limitations

The primary limitation is the substantial discrepancy in sample size across the three gatekeeper roles. Commissioning engineers (n = 81) are represented at approximately four times the sample size of HSE (n = 19) and QA/QC (n = 20). All findings for HSE and QA/QC should be treated as preliminary, and cross-role comparisons should be treated as indicative rather than definitive. Replication with a specifically larger HSE sample is the most pressing methodological priority: a within-HSE analysis of whether credential level independently predicts enforcement confidence and culture perceptions was not possible given the small within-group cell sizes (sub-degree n = 11, degree+ n = 8 within HSE), and this represents a targeted question for future research. The credential finding, while statistically robust, may not be representative across all 22 national contexts in the sample, given that qualification frameworks and HSE entry requirements differ by country and industry sector. Wage data were not collected, and the remuneration argument draws on UK industry benchmarking; direct empirical investigation of the wage-credential-enforcement

relationship is warranted. The gender analysis is limited by the small female subsample (n = 37 across all gatekeeper roles), which reduces the power of gender-stratified analyses and prevents examination of gender × role interactions. The cross-sectional design precludes causal inference throughout.

6. Conclusion

This paper documents both a shared gatekeeper condition and a structural differentiation in engineering enforcement roles, with significant implications for safety governance. The credential finding is among the most notable in its structural implications: 58% of HSE professionals hold sub-degree vocational qualifications, placing the role with the highest physical safety enforcement responsibility at the lowest position in the credential hierarchy of the three gatekeeper roles studied.

The safety enforcement pressure data provide operational evidence consistent with the patterns that credential theory predicts. HSE professionals experience substantially greater pushback when raising safety concerns (63% often+), greater frequency of risk assessments being rushed or superficial (58% often+), and greater pressure to accept inappropriate levels of safety risk (32% often+) than their QA/QC counterparts — with medium to large effect sizes on three of seven shared enforcement items. These are not abstract governance metrics. They are the daily operational experience of the professionals who bear formal responsibility for preventing injury, incident, and system failure on engineering projects.

The gatekeeper paradox — QA/QC best supported yet most hesitant — and commissioning's low-hesitation profile against the worst culture add further complexity. Enforcement confidence is shaped not primarily by organisational support but by structural position, professional identity, and the social authority that credential hierarchies generate. Together, these findings suggest that a reappraisal may be warranted: organisations that depend on HSE professionals to stop unsafe work must ensure those professionals operate from a position of sufficient status, remuneration, and procedural backing to make their authority credible to the engineering workforce they are required to enforce against. The credential-enforcement gap is not an individual problem. It reflects an organisational design pattern with safety implications — and those implications are now empirically visible.

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