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Legal Frameworks in Engineering Practice: Assessing the Awareness and Compliance of Engineering Professionals in the Philippines

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Abstract- ***Engineering practice in the Philippines is governed by various laws, codes, and regulations intended to ensure public safety, ethical conduct, and professional accountability. This study assessed the level of awareness of engineering laws and the degree of compliance with legal provisions among engineering professionals in the Philippines. A descriptive-correlational research design was employed, involving 46 licensed engineers from different engineering disciplines and employment sectors. Data were collected using a structured questionnaire measuring awareness of engineering-related laws and compliance with legal requirements in professional practice. Descriptive statistics, including mean and standard deviation, were used to summarize the respondents' awareness and compliance levels, while Pearson's correlation coefficient was applied to determine the relationship between the two variables. Results revealed that respondents generally demonstrated high compliance with legal provisions, particularly in documentation, safety implementation, and adherence to professional codes. However, relatively lower compliance was observed in areas related to procurement procedures, environmental protection measures, and intellectual property rights. The correlation analysis showed a very strong and statistically significant positive relationship between awareness of engineering laws and compliance with legal provisions ($r = .955$, $p < .001$), indicating that increased legal awareness is closely associated with higher levels of compliance. The findings highlight the importance of continuous legal education, regular professional development activities, and stronger institutional support to enhance legal awareness and sustain lawful engineering practice in the Philippines.***

Index Terms- ***Engineering Laws, Legal Compliance, Professional Practice, Engineering Ethics***

I. INTRODUCTION

A. Background of the Study

Engineering practice in the Philippines is governed by a comprehensive set of laws, regulations, and codes designed to ensure public safety, professional accountability, and ethical conduct [3][13]. Among these are the Republic Acts governing each engineering discipline such as RA 544 (Civil Engineering Law), RA 7920 (Electrical Engineering Law), and RA 8495 (Mechanical Engineering Law), as well as other relevant statutes including the Building Code, Fire Code, Environmental Law, and the Labor Code [3][7].

Despite the existence of these legal frameworks, varying degrees of awareness and compliance have been observed among practicing engineers, particularly in project/construction management [5], safety compliance, and documentation [11]. Such gaps may lead to professional negligence, project delays, or even legal sanctions [8][9]. Several studies highlight that compliance behavior among professionals is influenced by multiple factors including organizational culture, regulatory enforcement, and individual knowledge levels [12][14].

This study aims to assess the level of awareness and compliance of engineering professionals in the Philippines regarding pertinent engineering laws and regulations. By understanding these aspects, the study seeks to identify areas that require policy reinforcement, professional development, or institutional support to enhance lawful and ethical engineering practice.

B. Objective of the Study

General Objective:

The general objective of this research is to evaluate the awareness and compliance of engineering professionals with legal frameworks governing their practice in the Philippines.

Specifically, it aims to:

1. Identify demographic and professional factors affecting compliance.
2. Determine the level of awareness of engineers regarding key laws and professional codes.
3. Measure their compliance with these legal provisions in their professional undertakings.
4. Analyze the correlation between awareness and compliance levels.

C. Significance of the Study

This research will benefit the following groups:

Engineering Professionals – This study will deepen their understanding of the legal frameworks governing their respective fields, enabling them to align their professional activities with national laws and ethical standards. By being more aware of legal obligations, engineers can reduce risks of violations, enhance accountability, and promote public trust in the profession [2].

Engineering Firms and Organizations – The findings will help firms identify areas where compliance with engineering laws and codes may be lacking or inconsistent. This will enable them to implement corrective measures, strengthen internal policies, and ensure safer, more efficient, and law-abiding project operations [10].

Regulatory Bodies (PRC, PICE, etc.) – Results of this study can serve as empirical evidence to support the formulation of new regulations, improvement of existing policies, and development of relevant CPD programs. It can also help enforcement agencies recognize trends in compliance behavior and create targeted initiatives to uphold professional standards.

Educational Institutions – The results will guide curriculum developers and educators in integrating legal and ethical education into engineering programs [1][4]. This ensures that future engineers graduate with not only technical competence but also a solid understanding of their legal responsibilities as professionals [6].

Future Researchers – This study will serve as a foundational reference for those who wish to explore related topics such as professional ethics, compliance behavior, or policy effectiveness in engineering. It can also provide comparative data for longitudinal studies or interdisciplinary research on law, technology, and management.

II. METHODOLOGY

A. Research Design

This study utilized a descriptive-correlational quantitative research design. The descriptive part aims to determine the level of awareness and compliance of engineering professionals regarding existing legal frameworks and professional laws governing engineering practice in the Philippines. Meanwhile, the correlational component examined the relationship between the respondents' level of awareness and their corresponding level of compliance with these legal provisions. This design is appropriate since the study intends to describe existing conditions and relationships without manipulating any variables. Statistical analysis was used to interpret the data objectively and draw meaningful conclusions from the observed trends.

B. Population and Sample of the Study

The population of this study consisted of licensed engineering professionals currently practicing in the Philippines, particularly within Central Luzon. This includes practitioners from major engineering disciplines such as Civil, Mechanical, Electrical, Electronics, and Sanitary Engineering, who are employed in public agencies, private construction firms, manufacturing companies, or consultancy services.

A purposive sampling technique was employed to select respondents who meet specific inclusion criteria: (1) must be a licensed engineer, (2) must have at least one year of professional experience, and (3) must be actively engaged in engineering-related work. A target sample size of 40 to 50 respondents was sought to ensure statistical reliability and representation across various disciplines and sectors.

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The sample size is considered adequate for quantitative analysis using descriptive and correlational statistics.

C. Research Instruments

The primary data-gathering tool was a structured survey questionnaire developed by the researcher based on existing literature, professional laws, and relevant engineering codes. The questionnaire is divided into three parts:

Part I – Demographic Profile: This section collects background information such as age, gender, engineering discipline, years of experience, employment type, position, and participation in legal or CPD training.

Part II – Awareness of Engineering Laws: This section consists of Likert-scale items (1 = Not aware at all to 4 = Very aware) that measure respondents' familiarity with key engineering laws and codes, such as the Building Code, Fire Code, Environmental Law, and professional regulations.

Part III – Compliance with Legal Provisions: This section also uses a Likert-scale format (1 = Never to 4 = Always) to assess how frequently respondents adhere to legal and ethical requirements in their professional practice, including obtaining permits, following safety standards, and observing ethical guidelines.

To ensure reliability and validity, the questionnaire undergone content validation by three experts—one legal professional, one senior engineer, and one academic researcher. A pilot test involving 20 engineers was conducted to determine the instrument's clarity and internal consistency using Cronbach's Alpha, with a coefficient of at least 0.70 indicating acceptable reliability.

D. Data Collection Procedure

Prior to data collection, the researchers secured formal approval from the research adviser and relevant institutional authorities. Permission letters were sent to engineering organizations, firms, and associations to request participation in the survey.

Once approval is granted, the validated questionnaires were distributed either online (via Google Forms) or in printed format during professional gatherings or workplace visits. Respondents were informed about the purpose of the study, assured of confidentiality, and asked to provide informed consent before answering the survey.

Collected data were checked for completeness and accuracy before tabulation. Responses were encoded and organized in a spreadsheet or statistical software (e.g., SPSS or Excel) for analysis. After analysis, results were summarized, interpreted, and discussed in relation to the study's objectives and hypotheses.

E. Statistical Treatment

The data gathered were analyzed using both descriptive and inferential statistical methods, as follows:

a. Descriptive Statistics – Mean and standard deviation were computed to determine the respondents' level of awareness and level of compliance. Results were verbally interpreted using established scale ranges (e.g., low, moderate, or high).

b. Frequency and Percentage Distribution – Used to describe the demographic profile of the respondents.

c. Pearson's Product-Moment Correlation Coefficient (r) – Used to determine the relationship between the level of awareness and level of compliance of the respondents.

A significance level of 0.05 was used as the basis for rejecting or accepting the null hypotheses. Statistical computations were carried out using SPSS or similar software to ensure accuracy and reliability of results.

III. RESULTS

This section presents the analysis and interpretation of the data gathered from the respondents. Results were presented systematically, beginning with demographic characteristics, followed by awareness levels across different legal frameworks compliance patterns, and the correlation analysis between awareness and compliance. Discussion relates findings to existing literature on organizational compliance, professional ethics, and legal frameworks in engineering practice.

A. Frequency Distribution of the Respondents

Table 1 presents the demographic profile of the 46 respondents in terms of engineering discipline, highest educational attainment, years of professional experience, current employment, position or role, and attendance in continuing professional development (CPD) seminars. In terms of engineering discipline, the majority of the respondents were Civil Engineers (50.00%, n = 23), followed by Electrical Engineers (21.74%, n = 10). Mechanical and Electronics Engineers each accounted for 10.87% (n = 5), while Sanitary Engineers comprised 4.35% (n = 2), and Aeronautical Engineers represented the smallest group at 2.17% (n = 1).

With regard to highest educational attainment, most respondents held a Bachelor's degree (78.26%, n = 36), while 19.57% (n = 9) had completed a Master's degree. Only one respondent (2.17%, n = 1) held a Doctoral degree, indicating that the majority of practicing engineers in the sample possess undergraduate-level qualifications.

In terms of professional experience, the largest proportion of respondents had 4 to 7 years of experience (30.43%, n = 14), followed by those with 1 to 3 years (23.91%, n = 11). Respondents with 8 to 12 years of experience accounted for 21.74% (n = 10), while those with 13 to 20 years represented 13.04% (n = 6). Engineers with 21 years or more of experience comprised the smallest group at 10.87% (n = 5).

Regarding current employment, more than half of the respondents were employed in private firms (54.35%, n = 25). This was followed by those working as contractors (17.39%, n = 8) and in government agencies (15.22%, n = 7). A smaller proportion were self-employed (8.70%, n = 4), while respondents in academia accounted for only 4.35% (n = 2).

In terms of position or role, the most common role was Project Engineer (30.43%, n = 14), followed by Staff Engineer (23.91%, n = 11). Project Managers comprised 19.57% (n = 9), while Inspectors accounted for 8.70% (n = 4). Owners/Partners and Consultants each represented 6.52% (n = 3), and respondents classified under other roles made up 4.35% (n = 2).

Finally, with respect to participation in continuing professional development, a substantial majority of respondents had attended CPD seminars within the last two years (71.74%, n = 33). In contrast, 28.26% (n = 13) reported that they had not attended any CPD seminars during the same period, suggesting variability in ongoing professional training among the respondents.

Table 1

Frequency Distribution of the Respondents

Demographics	Frequency	Percentage
Engineering Discipline		
Civil	23	50.00%
Electrical	10	21.74%
Mechanical	5	10.87%
Electronics	5	10.87%
Sanitary	2	4.35%
Aeronautical	1	2.17%
Highest Educational Attainment		
Bachelor's	36	78.26%
Master's	9	19.57%
PhD	1	2.17%
Years of Professional Experience		
1-3	11	23.91%
4-7	14	30.43%
8-12	10	21.74%
13-20	6	13.04%
21+	5	10.87%
Current Employment		
Private firm	25	54.35%
Contractor	8	17.39%
Government agency	7	15.22%
Self-employed	4	8.70%
Academia	2	4.35%
Position / Role		
Project Manager	9	19.57%
Project Engineer	14	30.43%
Inspector	4	8.70%
Staff Engineer	11	23.91%
Owner/Partner	3	6.52%
Consultant	3	6.52%
Other	2	4.35%
Attended CPD Seminar (last 2 years)		
Yes	33	71.74%
No	13	28.26%
Total	**46**	**100.00%**

B. Descriptive Summary of the Respondents' Self-Rated Awareness of the Engineering Laws of their Respective Discipline

Table 2 presents the descriptive summary of the respondents' self-rated awareness of the engineering laws governing their respective disciplines. The highest mean was observed in the statement "Awareness of the professional code of ethics and disciplinary procedures of the professional regulating body (PRC/PICE/other)" (M = 3.78, SD = 0.42), which was verbally described as "Very Aware." This indicates that the respondents possess a strong

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awareness of ethical standards and disciplinary mechanisms that regulate professional engineering practice.

In contrast, the lowest mean was recorded in the statement "Awareness of the Intellectual Property Code (patents, copyrights, trademarks) as it affects designs and innovations" (M = 2.33, SD = 0.84), verbally described as "Slightly Aware." This suggests that while respondents are generally familiar with core professional and regulatory laws, awareness of intellectual property–related provisions remain limited, particularly in areas concerning ownership and protection of engineering designs and innovations. The overall mean of 3.05 (SD = 0.90) indicates that the respondents are "Moderately Aware" of the legal frameworks governing engineering practice. This overall finding suggests that although engineers demonstrate strong awareness of discipline-specific laws, ethical codes, and permitting requirements, there is still a need to strengthen knowledge in corporate, procurement, and intellectual property laws to ensure comprehensive legal compliance in professional practice.

Table 2
Descriptive Summary of the Respondents' Self-Rated Awareness of the Engineering Laws of their Respective Discipline

Statements	Mean	Standard Deviation	Verbal Description
1. Awareness of the provisions of your discipline's enabling law (e.g., Civil, Electrical, Mechanical, etc.).	3.74	0.49	Very Aware
2. Awareness of the Philippine Building Code (PD 1096) and its implementing provisions.	3.52	0.62	Very Aware
3. Awareness of the Fire Code (RA 9514) requirements relevant to building design and occupancy.	3.37	0.71	Very Aware
4. Awareness of the Electrical Code (P.C.C.) / National Electrical Code provisions for safe electrical installations.	3.09	0.84	Moderately Aware
5. Awareness of the Environmental laws related to engineering projects (e.g., EIS requirements, DENR permits).	3.07	0.74	Moderately Aware
6. Awareness of the Water Code and regulations affecting water resources projects.	2.54	0.89	Moderately Aware
7. Awareness of the Labor Code provisions relevant to worksite safety, wages, and contractor obligations.	2.93	0.77	Moderately Aware
8. Awareness of the Local Government procurement rules (i.e., RA 9184 / procurement regulations) and how they affect public projects.	2.59	0.96	Moderately Aware
9. Awareness of the Three-Fold Responsibilities for engineers (administrative, civil, and criminal liabilities).	3.17	0.80	Moderately Aware
10. Awareness of pertinent provisions of the Civil Code (contracts, obligations, property law) relevant to engineering contracts.	2.87	0.75	Moderately Aware
11. Awareness of the Revised Penal Code provisions that may apply to professional negligence or misconduct.	2.57	1.00	Moderately Aware
12. Awareness of the Corporation Code and Tax Code as they relate to firm registration and tax obligations.	2.35	0.99	Slightly Aware
13. Awareness of the Intellectual Property Code (patents, copyrights, trademarks) as it affects designs and	2.33	0.84	Slightly Aware
14. Awareness of the professional code of ethics and disciplinary procedures of the professional regulating body (PRC/PICE/other).	3.78	0.42	Very Aware
15. Awareness of the required permits and documentary requirements before starting construction (building permits, environmental clearances, etc.).	3.67	0.47	Very Aware
16. Awareness of the penalties and sanctions for non-compliance with engineering laws and codes.	3.24	0.77	Moderately Aware
Overall	**3.05**	**0.90**	**Moderately Aware**

Range: 1.00-1.75 not aware at all; 1.76-2.50 slightly aware; 2.51-3.20 moderately aware; 3.21-4.00 very aware

C. Descriptive Summary of the Respondents' Compliance with Legal Provisions

Table 3 presents the descriptive summary of the respondents' compliance with legal provisions in their professional engineering practice. The highest mean was observed in two statements: "I keep complete and accurate project documentation (drawings, change orders, permits, inspection reports)" and "I apply occupational health and safety requirements (PPE enforcement, safety briefings) on site," both with a

mean of 3.96 (SD = 0.21) and verbally described as "Always." These results indicate that the respondents consistently observe proper documentation practices and prioritize workplace safety, reflecting strong adherence to legally mandated engineering standards.

In contrast, the lowest mean was recorded in the statement "I ensure that procurement for public projects follows statutory procurement procedures" with a mean of 2.74 (SD = 1.02), which was verbally described as "Sometimes." This suggests that compliance with procurement-related legal requirements is less consistent, possibly due to varying levels of involvement in public projects or limited familiarity with procurement laws among some respondents.

The overall mean of 3.59 (SD = 0.65) indicates that the respondents "Always" comply with legal provisions in their professional practice. This overall finding suggests that while engineers demonstrate high compliance in areas directly related to safety, documentation, and ethical conduct, there remains room for improvement in procurement procedures and intellectual property compliance to ensure full adherence to all legal requirements.

Table 3
Descriptive Summary of the Respondents' Compliance with Legal Provisions

Statements	Mean	Standard Deviation	Verbal Description
1. I ensure that required permits (building permit, environmental clearance) are obtained before project start.	3.85	0.36	Always
2. I follow relevant codes (Building Code, Fire Code, Electrical Code) when preparing designs or reviewing contractor work.	3.89	0.31	Always
3. I require contractors/subcontractors to present valid licenses and permits before mobilization.	3.87	0.34	Always
4. I keep complete and accurate project documentation (drawings, change orders, permits, inspection reports).	3.96	0.21	Always
5. I incorporate environmental protection measures required by law in project planning and implementation.	3.17	0.68	Sometimes
6. I apply occupational health and safety requirements (PPE enforcement, safety briefings) on site.	3.96	0.21	Always
7. I comply with labor laws regarding working hours, wages, and contractor obligations.	3.72	0.46	Always
8. I disclose conflicts of interest and avoid situations that violate professional ethics.	3.85	0.36	Always
9. I ensure that procurement for public projects follows statutory procurement procedures.	2.74	1.02	Sometimes
10. I respect intellectual property (I acknowledge originals, avoid unauthorized copying of patented designs).	2.91	0.72	Sometimes
11. I report violations or unsafe practices to the appropriate authorities when necessary.	3.41	0.50	Always
12. I comply with tax and corporate registration requirements relevant to my firm's operations.	3.76	0.48	Always
13. I include contractual provisions that address legal liabilities and indemnities in project contracts.	3.54	0.50	Always
Overall	**3.59**	**0.65**	**Always**

Range: 1.00-1.75 never; 1.76-2.50 rarely; 2.51-3.20 sometimes; 3.21-4.00 always

D. Correlation Analysis between the Respondents' Awareness of Engineering Laws of their Respective Discipline and their Compliance with Legal Provisions

Table 4 presents the results of the Pearson product–moment correlation analysis examining the relationship between the respondents' awareness of engineering laws and their compliance with legal provisions. The analysis revealed a very strong positive correlation between awareness of engineering laws and compliance with legal provisions, $r = .955$, $p < .001$, indicating a statistically significant relationship.

This result suggests that respondents who demonstrate higher levels of awareness of engineering laws also tend to exhibit higher levels of compliance with legal requirements in their professional practice. The strength of the correlation implies that legal awareness plays a critical role in shaping compliant behavior

among engineering professionals, emphasizing the importance of continuous legal education and professional development to promote lawful and ethical engineering practice.

Table 4
Correlation Analysis between the Respondents' Awareness of Engineering Laws of their Respective Discipline and their Compliance with Legal Provisions Using Pearson r

Variable 1	Variable 2	r	p-value	Remarks
Awareness of Engineering Laws	Compliance with Legal Provisions	.955**	<0.001	Significant

***p-value < 0.05*

IV. CONCLUSION

A. Summary of Findings

This study examined the awareness of engineering laws and the level of compliance with legal provisions among engineering professionals in the Philippines, with the aim of determining whether awareness of legal frameworks influences compliant professional behavior.

The demographic profile revealed that the majority of respondents were Civil Engineers (50.00%, n = 23), followed by Electrical Engineers (21.74%, n = 10), with smaller representations from Mechanical, Electronics, Sanitary, and Aeronautical Engineering disciplines. Most respondents held a Bachelor's degree (78.26%, n = 36), while fewer had completed graduate studies. In terms of professional experience, the largest group had 4 to 7 years of experience (30.43%, n = 14), followed by those with 1 to 3 years (23.91%, n = 11). More than half of the respondents were employed in private firms (54.35%, n = 25), and the most common positions were Project Engineer (30.43%, n = 14) and Staff Engineer (23.91%, n = 11). A substantial majority had attended CPD seminars within the last two years (71.74%, n = 33).

With respect to awareness of engineering laws, the highest-rated items were awareness of the professional code of ethics and disciplinary procedures (M = 3.78, SD = 0.42) and awareness of discipline-specific enabling laws (M = 3.74, SD = 0.49), both verbally described as Very Aware. The lowest awareness was observed in intellectual property laws (M = 2.33, SD = 0.84) and corporation and tax laws (M = 2.35, SD = 0.99), which were described as Slightly Aware. The overall mean awareness score of 3.05 (SD = 0.90) indicates that respondents were generally Moderately Aware of engineering-related legal frameworks.

In terms of compliance with legal provisions, the highest means were recorded in maintaining complete project documentation and applying occupational health and safety requirements, both with a mean of 3.96 (SD = 0.21), described as Always. The lowest compliance was observed in adherence to procurement procedures for public projects (M = 2.74, SD = 1.02), described as Sometimes. The overall mean compliance score of 3.59 (SD = 0.65) suggests that respondents generally Always comply with legal requirements in their professional practice.

Finally, the Pearson correlation analysis revealed a very strong positive and statistically significant relationship between awareness of engineering laws and compliance with legal provisions ($r = .955$, $p < .001$). This indicates that higher awareness of legal frameworks is strongly associated with higher levels of compliance among engineering professionals.

B. Conclusions

Based on the findings of the study, the following conclusions are drawn:

1. The engineering professionals who participated in the study represent a diverse range of disciplines, experience levels, and employment sectors, with the majority actively engaged in private-sector engineering practice and project-based roles. This diversity suggests that the findings reflect a broad perspective on legal awareness and compliance within the engineering profession.
2. Engineering professionals generally demonstrate a moderate level of awareness of laws governing their practice, with stronger familiarity in areas directly related to professional regulation, ethics, and permitting requirements. However, awareness is relatively lower in corporate, tax, procurement, and intellectual property laws, indicating gaps in legal knowledge beyond core technical regulations.
3. The respondents exhibit a high level of compliance with legal provisions, particularly in areas related to safety, documentation, ethical conduct, and regulatory requirements. This suggests that engineers prioritize compliance in aspects of practice that have direct implications for public safety and professional accountability.

4. The presence of a very strong positive correlation between awareness and compliance confirms that legal awareness plays a crucial role in shaping compliant behavior. Engineers who are more knowledgeable about legal frameworks are significantly more likely to adhere to legal and ethical requirements in their professional practice.
5. Overall, the study concludes that strengthening legal awareness among engineering professionals is essential in sustaining lawful, ethical, and responsible engineering practice in the Philippines.

C. Recommendations

Based on the conclusions drawn from the study, the following recommendations are proposed:
1. Engineering professionals should actively participate in continuing professional development programs that emphasize not only technical competence but also legal and regulatory updates, particularly in areas such as procurement, taxation, and intellectual property.
2. Engineering firms and organizations are encouraged to institutionalize regular legal compliance training and internal audits to ensure that engineers remain informed of applicable laws and consistently adhere to legal standards in project execution.
3. Regulatory bodies and professional organizations such as the PRC and accredited professional associations may consider strengthening CPD offerings focused on legal frameworks, jurisprudence, and case-based learning to enhance practical legal understanding among engineers.
4. Higher education institutions offering engineering programs should integrate engineering law, ethics, and regulatory compliance more deeply into the curriculum to prepare future engineers for the legal responsibilities of professional practice.
5. Future researchers may conduct similar studies using qualitative or mixed-method approaches, expand the scope to other regions or engineering disciplines, or examine additional variables such as organizational culture and enforcement mechanisms to further understand factors influencing legal compliance.

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