

Assessment of Construction Surveying Practices of Non-Geodetic Engineer Personnel in Region III: Basis for a Surveying Practice Enhancement Program

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Abstract: Construction surveying is vital to ensuring accurate positioning, structural alignment, elevation, and overall build quality across all project stages. In the Philippines, Republic Act No. 8560 (as amended by Republic Act No. 9200) mandates that professional surveying works fall under the exclusive domain of Licensed Geodetic Engineers. However, tight project schedules, manpower constraints, and budget limits often lead construction management teams to delegate routine survey tasks such as layouting, stakeout, and elevation checking to non-geodetic personnel without direct professional supervision. This study assesses the construction surveying practices performed by non-geodetic personnel in Region III. Utilizing a descriptive quantitative research design, data were gathered from Licensed Geodetic Engineers and Project Management Team personnel. The findings reveal that while utilizing on-site technical staff helps maintain operational speed, it introduces critical challenges, including measurement errors, weak field documentation, and regulatory compliance risks. Respondents strongly agreed that unmonitored surveying practices negatively impact measurement accuracy and increase project rework. To bridge the gap between statutory mandates and field practices, this study proposes a structured Surveying Practice Enhancement Program. The framework aims to strengthen technical supervision, improve quality control protocols, and elevate legal compliance across construction projects.

Keywords: As-Built Verification, Construction Surveying, Geodetic Engineering, Layout and Stakeout, Non-Geodetic Personnel, Project Management, Region III (Central Luzon), Republic Act No. 8560, Surveying Practice Enhancement, Technical Supervision.

1. Introduction

Surveying serves as the technical foundation of any construction project, providing the critical spatial controls necessary to verify alignment, elevation, layout, and structural boundaries from initial site development through to project completion. In the Philippines, the professional practice of geodetic engineering is legally regulated under Republic Act No. 8560, as amended by Republic Act No. 9200. These statutes explicitly require that official surveying works and technical verifications be performed or supervised by Licensed

Geodetic Engineers (LGEs). Despite these clear legal parameters, a noticeable disconnect exists between regulatory mandates and actual day to day site operations. In fast paced construction environments, constraints such as tight project schedules, limited availability of geodetic engineers, and budget limitations frequently compel project managers to assign essential surveying activities such as gridline establishment, elevation markings and checks, and stakeout to non-geodetic personnel, including civil engineers, site engineers, and technical staff. While this practice allows construction work to proceed without immediate delays, executing survey tasks without direct geodetic supervision raises significant technical, operational, and legal concerns. From the perspective of Licensed Geodetic Engineers, improper measurement and layout procedures can cause cumulative structural misalignments, costly rework, schedule delays, and legal liabilities. Concurrently, Project Management Teams encounter recurring difficulties with documentation, field coordination, and survey verification. Recognizing these industry realities, this study evaluates how Licensed Geodetic Engineers in Region III and Project Management Teams perceive and assess the performance of non-geodetic personnel conducting survey activities. By examining field experiences, operational challenges, and compliance gaps, this research serves as the basis for a practical Surveying Practice Enhancement Program designed to strengthen technical supervision, enhance quality assurance, and promote regulatory compliance in construction management.

2. Review of Related Literature

A. The Role and Importance of Construction Surveying

Surveying is a fundamental component of civil engineering and construction projects because it provides the precise spatial framework required for successful implementation. Construction surveying, as defined by Schofield and Breach [1], involves establishing boundaries, elevations, alignments, and control networks to ensure that physical structures are built

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strictly according to approved engineering plans and specifications. Similarly, Uren and Price [2] describe surveying as the process of determining the relative positions of spatial points on or near the Earth's surface through distance and angle measurements. Because modern construction relies on tight tolerances, inaccuracies in field layout can trigger severe operational issues, including structural misalignments, project delays, cost overruns, and legal disputes [3]. Consequently, maintaining reliable survey controls and rigorous field verification procedures is essential to prevent systematic technical errors during project execution.

B. Legal Framework Governing Surveying Practices in the Philippines

In the Philippines, Republic Act No. 8560 [4], also known as the Philippine Geodetic Engineering Act of 1998, as amended by Republic Act No. 9200 [5], mandates that engineering and construction surveys which include layouting, alignment verification, line and grade determination, and as-built mapping require professional responsibility and must be executed by or under the direct supervision of a Licensed Geodetic Engineer (LGE). Furthermore, all official survey plans and technical documents must bear the signature, license number, and official seal of a registered geodetic engineer to be legally recognized.

C. Coordination, Quality Control, and Supervision Risks

Construction project management relies heavily on clear communication, rigorous quality control, and effective technical coordination among interdisciplinary project teams [6], [7]. Inadequate field supervision, improper documentation, and a lack of quality control procedures are widely recognized as primary drivers of rework, project delays, and financial overruns [3], [8]. When non-geodetic personnel execute surveying activities without direct oversight from Licensed Geodetic Engineers (LGEs), these organizational vulnerabilities become especially pronounced during spatial layout operations. Without professional supervision to enforce standard error-checking protocols, field measurement mistakes can easily go undetected, leading to structural misalignments during construction.

D. Modern Technology and Its Requirements for Competence

Modern technologies, including Total Stations, GNSS receivers, Real-Time Kinematic (RTK) systems, and terrestrial laser scanners, have significantly enhanced construction efficiency and measurement precision [2], [3]. These advanced instruments allow field personnel to execute fast layouting and complex spatial positioning. However, automated output can create a false sense of security; effective instrument operation still requires a thorough understanding of coordinate systems, instrument calibration, and error propagation [1]. Without proper technical knowledge and professional supervision, operator errors in setup or calibration can silently propagate systematic inaccuracies throughout the construction process.

E. Research Gap in Local Literature

The reviewed literature reveals a continuing gap between legal surveying mandates and actual construction industry

practices in the Philippines. Furthermore, there is limited local research assessing how Project Management Teams and Licensed Geodetic Engineers evaluate surveying activities performed by non-geodetic personnel on active job sites. Most existing studies, such as the research on geodetic surveying education for civil engineering students by Ustinova et al. [9], focus primarily on classroom academic methods or isolated technical procedures. Very few studies examine the operational observations, legal concerns, and professional evaluations of industry stakeholders regarding non-geodetic personnel conducting field surveying. This study addresses this specific gap by gathering empirical observations and field experiences from key construction stakeholders in Region III.

F. Synthesis

The reviewed literature demonstrates that surveying accuracy directly influences construction quality, project efficiency, structural safety, and regulatory compliance [1]–[3]. Existing studies consistently identify measurement errors, inadequate technical supervision, and poor documentation as primary drivers of rework and project delays during implementation [6]–[8]. Furthermore, the literature highlights a critical operational paradox: while Philippine law explicitly reserves professional surveying activities for Licensed Geodetic Engineers [4], [5], practical site demands and manpower constraints often result in non-geodetic personnel executing daily layout and elevation tasks.

Most prior studies examine technical surveying methodologies and construction management strategies in isolation. There remains a lack of empirical research evaluating the joint perspectives, field observations, and operational concerns of both Licensed Geodetic Engineers and Project Management Teams regarding non-geodetic staff conducting site surveys. This study addresses this gap by evaluating current industry practices, technical risks, and legal implications within Region III, serving as the foundation for a proposed Surveying Practice Enhancement Program.

G. Conceptual Framework

The study is anchored on the concept that proper surveying practices and professional supervision contribute to better construction project quality, accuracy, efficiency, and legal compliance.

1) Input

- Professional profile of respondents
- Observed surveying practices in construction projects
- Experiences related to non-GE surveying works
- Technical and operational challenges encountered
- Existing quality control and coordination procedures
- Awareness of legal and regulatory requirements

2) Process

- Distribution of survey questionnaires
- Collection of professional observations and assessments
- Data tabulation and statistical analysis
- Interpretation of findings

3) Output

- Assessment of surveying practices performed by non-GE personnel
- Identification of technical, operational, and legal concerns
- Proposed recommendations for improved surveying management and compliance

H. Statement of the Problem

This study aims to assess the surveying practices performed by non-Geodetic Engineer personnel in construction projects as perceived by Licensed Geodetic Engineers and Project Management Teams in Region III. Specifically, it seeks to answer the following questions:

1. What is the profile of the respondents in terms of:
 - 1.1 Profession;
 - 1.2 Years of experience in the construction industry;
 - 1.3 Types of construction projects handled; and
 - 1.4 Nature of involvement in construction surveying activities?
2. How may the surveying practices performed by non-Geodetic Engineer personnel be described in terms of:
 - 2.1 Site layout and stakeout;
 - 2.2 Elevation and level measurements;
 - 2.3 As-built surveys and verification;
 - 2.4 Quantity and dimensional measurements; and
 - 2.5 Use of surveying instruments and technologies?
3. How may the effects of surveying practices performed by non-Geodetic Engineer personnel on construction projects be described in terms of:
 - 3.1 Project quality;
 - 3.2 Construction accuracy;
 - 3.3 Project timelines;
 - 3.4 Safety; and
 - 3.5 Legal and regulatory compliance?
4. Based on the findings of the study, what Surveying Practice Enhancement Program may be proposed to strengthen surveying practices performed by non-Geodetic Engineer personnel in construction projects?

I. Scope and Delimitation

This study focuses on the assessment of surveying practices performed by non-Geodetic Engineer personnel in construction projects. The respondents are limited to Licensed Geodetic Engineers from Region III and Project Management Team personnel involved in construction projects.

The study evaluates professional opinions, observations, experiences, and assessments regarding construction-related surveying activities such as lay outting, elevation checking, as-built surveys, control point establishment, and site measurements.

The study does not directly assess or survey non-Geodetic Engineer personnel who perform surveying tasks. Likewise, this research does not include cadastral surveys, hydrographic surveys, mining surveys, or other specialized geodetic applications outside of construction projects.

The findings are limited to the responses gathered from

selected respondents during the conduct of this study.

J. Significance of the Study

1. *Licensed Geodetic Engineers:* This study may strengthen awareness regarding the importance of proper geodetic supervision and professional accountability in construction surveying activities, helping them understand the current industry practices and advocate for better compliance.
2. *Project Management Teams:* The findings may help project managers improve quality control procedures, enhance technical coordination among project teams, and strengthen project monitoring related to surveying works, leading to more efficient project delivery.
3. *Construction Companies and Developers:* This study may guide construction firms in establishing better technical management systems, reducing risks associated with inaccurate surveying practices, and minimizing costly rework or legal disputes.
4. *Regulatory Agencies and Professional Organizations:* The results may provide useful information for the Professional Regulation Commission, the Philippine Institute of Civil Engineers, and local government units in reviewing policies, strengthening implementation of surveying regulations, and promoting better interdisciplinary collaboration between geodetic engineers and other construction professionals.
5. *Future Researchers:* This study may serve as reference material for future studies related to construction management, surveying practices, professional engineering collaboration, and the legal aspects of geodetic engineering practice in the Philippines.

3. Research Methodology

A. Research Design

The study utilized a descriptive quantitative research design. This method is appropriate because it allows the researcher to gather and evaluate the opinions, observations, experiences, and assessments of Licensed Geodetic Engineers and Project Management Team personnel regarding surveying practices performed by non-Geodetic Engineer personnel in construction projects.

Survey questionnaires served as the primary data gathering instrument.

B. Locale of the Study

The study was conducted in selected construction projects and engineering offices within Region III.

C. Respondents

The respondents of the study consist of:

- Licensed Geodetic Engineers from Region III
- Project Management Team personnel involved in construction projects.

Purposive sampling was utilized in selecting respondents

who have direct professional experience and involvement in construction surveying activities and project supervision.

D. Data Gathering Instrument

The researcher utilized structured survey questionnaires designed separately for:

1. Licensed Geodetic Engineers
2. Project Management Team personnel

The questionnaires contained questions related to:

- Observed surveying practices
- Technical issues and project challenges
- Quality control procedures
- Legal compliance
- Professional assessment of non-GE surveying works
- Recommendations for improvement

E. Data Gathering Procedure

The researcher first secured permission from respondents before conducting the survey. The purpose of the study was explained properly to all participants.

Questionnaires were distributed personally and electronically. The collected data were organized, tabulated, analyzed, and interpreted.

F. Data Analysis Technique

The gathered data were analyzed using descriptive statistical tools such as:

- Frequency
- Percentage
- Weighted Mean
- Ranking

These statistical methods helped determine the common observations, issues, and assessments regarding surveying practices performed by non-Geodetic Engineer personnel.

G. Ethical Concerns

The researcher observed confidentiality, honesty, and professionalism throughout the conduct of the study. Participation of respondents was voluntary, and all information gathered were used strictly for academic purposes only.

The identities of respondents and participating companies were kept confidential unless permission is granted for disclosure.

4. Results and Discussion

This section presents the findings, analysis, and interpretation of the data gathered from Licensed Geodetic Engineers (LGEs) in Region III and Project Management Team (PMT) personnel involved in construction projects. The presentation of data utilizes descriptive statistical tools such as frequency, percentage, weighted mean, and ranking. The discussion focuses on their observations, experiences, and assessment regarding surveying works performed by non-Geodetic Engineer personnel in construction projects.

A. Profile of Respondents

Table 1
Distribution of respondents according to profession

Profession	Frequency	Percentage	Rank
Licensed Geodetic Engineers	20	50.00%	1
Project Management Team Personnel	20	50.00%	1
Total	40	100%	

Table 1 shows that the respondents were equally distributed between Licensed Geodetic Engineers and Project Management Team personnel, each comprising 50% of the total respondents. This distribution provided balanced professional perspectives regarding surveying practices performed by non-Geodetic Engineer personnel in construction projects.

Table 2
Distribution of respondents according to years of professional experience

Years of Experience	Frequency	Percentage	Rank
1 – 5 Years	8	20.00%	3
6 – 10 Years	14	35.00%	2
More than 10 Years	18	45.00%	1
Total	40	100%	

The table 2 shows that majority of the respondents have more than 10 years of professional experience, representing 45% of the total respondents. This indicates that most respondents possess extensive field exposure and professional experience related to construction surveying and project implementation.

The respondents of the study were composed of Licensed Geodetic Engineers from Region III and Project Management Team personnel involved in residential, commercial, and infrastructure projects.

Most of the Licensed Geodetic Engineer respondents have more than five years of professional experience in construction surveying, engineering surveys, and project implementation. Many of them are directly involved in construction lay-outing, verification surveys, as-built surveys, and quality control activities.

Meanwhile, the Project Management Team respondents are composed of Project Engineers, Site Engineers, QA/QC personnel, and Project Supervisors who regularly monitor site activities and coordinate with surveying teams during project implementation.

The majority of respondents are involved in medium to large-scale construction projects where accurate surveying and proper technical coordination are essential for project success.

B. Common Surveying Activities Performed by Non-Geodetic Engineer Personnel

Table 3 reveals that structural and architectural lay-outing ranked first among the surveying activities commonly performed by non-Geodetic Engineer personnel, with a frequency of 36 or 90% of the respondents.

Elevation checking ranked second with 85%, while gridline establishment ranked third with 80%. The findings indicate that non-GE personnel are highly involved in daily construction surveying activities, particularly those directly connected to construction implementation and project progress.

Licensed Geodetic Engineers emphasized that although these

Table 3
Common surveying activities observed in construction projects

Surveying Activity	Frequency	Percentage	Rank
Structural and Architectural Lay-outing	36	90.00%	1
Elevation Checking	34	85.00%	2
Gridline Establishment	32	80.00%	3
As-built Measurements	30	75.00%	4
Foundation Lay-outing	28	70.00%	5
Alignment and Verticality Monitoring	24	60.00%	6

Table 4
Technical and operational problems observed in surveying activities

Problems Encountered	Frequency	Percentage	Rank
Measurement Errors	35	87.50%	1
Weak Documentation and Record Keeping	32	80.00%	2
Lack of Technical Supervision	30	75.00%	3
Communication and Coordination Problems	28	70.00%	4
Improper Instrument Handling	24	60.00%	5
Calibration Issues	20	50.00%	6

tasks are frequently considered routine site activities, they still require proper technical knowledge and professional supervision to ensure accuracy and compliance with standards.

Respondents explained that these activities are often assigned to Site Engineers or technical staff because they are already present on-site and can immediately respond to project requirements.

Project Management Team respondents stated that assigning these tasks to available technical personnel helps maintain project schedules and reduce delays during daily operations. However, Licensed Geodetic Engineers emphasized that while these activities may appear routine, they still require technical understanding of surveying principles, instrument calibration, coordinate systems, and error checking procedures.

The findings indicate that non-Geodetic Engineer personnel are frequently involved in actual field surveying operations despite the legal limitations under Republic Act No. 8560 and Republic Act No. 9200.

C. Technical and Operational Issues Encountered

The table 4 shows that measurement errors ranked first among the observed technical and operational problems, with 87.50% of respondents identifying it as a major concern.

Weak documentation and record keeping ranked second with 80%, while lack of technical supervision ranked third with 75%.

The findings indicate that many project issues associated with surveying activities are related to insufficient verification procedures, improper documentation, and limited technical oversight during construction implementation.

According to Licensed Geodetic Engineers, improper handling of instruments and absence of calibration checking may also contribute to inaccuracies in survey outputs and construction alignment.

1) Measurement Errors

One of the most common concerns raised by respondents is the occurrence of measurement errors during construction lay-outing and elevation checking.

Licensed Geodetic Engineers explained that some errors occur due to:

- Improper instrument setup
- Lack of calibration checking

- Incorrect reference points
- Incomplete verification procedures
- Failure to perform double-checking methods

Project Management Team respondents also shared that minor errors in survey lay-outing sometimes lead to rework, alignment corrections, and additional project expenses.

Although some errors may initially appear small, respondents emphasized that accumulated inaccuracies may eventually affect structural alignment, finishing works, and overall project quality.

2) Weak Documentation and Record Keeping

Another issue identified is the lack of proper documentation during surveying activities.

According to respondents, many field personnel rely mainly on verbal instructions and informal coordination. In some projects, survey records, field notes, and verification reports are incomplete or not properly archived.

Licensed Geodetic Engineers stressed that proper documentation is essential because survey data serves as the technical basis for construction implementation, project verification, and future reference.

Weak documentation may also create problems during audits, quality inspections, variation claims, and dispute resolution.

3) Limited Technical Supervision

The study also found that some construction projects have limited direct supervision from Licensed Geodetic Engineers during daily surveying operations.

Project Management Team respondents explained that due to manpower limitations and project scheduling demands, some survey activities are conducted independently by site personnel without direct review from Geodetic Engineers.

From the perspective of Licensed Geodetic Engineers, this setup increases the possibility of unnoticed technical errors, especially in projects involving complex alignments, vertical structures, and detailed elevation controls.

The respondents emphasized that proper supervision is important to maintain accuracy, consistency, and compliance with professional standards.

4) Communication and Coordination Issues

The findings also reveal that coordination problems

sometimes occur between survey personnel, engineers, contractors, and project supervisors.

Some respondents observed that revisions in plans, changes in reference elevations, and updated gridlines are not always communicated immediately to all field personnel.

This situation may lead to incorrect lay-outing, delayed corrections, and confusion during project execution.

The respondents explained that better coordination systems and written communication procedures are necessary to minimize technical misunderstandings on-site.

D. Assessment of the Effects of Non-GE Surveying Practices

Table 5 shows that the respondents strongly agree that surveying practices performed by non-Geodetic Engineer personnel may affect construction accuracy, obtaining the highest weighted mean of 4.61.

The respondents also agreed that these practices may increase project rework, contribute to project delays, create legal concerns, and affect structural safety.

The results indicate that accurate surveying and proper technical supervision are highly important in maintaining construction quality, project efficiency, and compliance with engineering standards.

1) Effects on Project Quality

Most respondents agreed that inaccurate surveying directly affects construction quality.

Licensed Geodetic Engineers explained that even small errors in positioning and elevation may affect structural alignment, wall straightness, floor leveling, and finishing works.

Project Management Team respondents also shared that inaccurate survey outputs sometimes result in:

- Chipping works
- Realignment of structures
- Additional finishing corrections
- Delays in succeeding activities

The findings show that accurate surveying is highly important in maintaining overall construction quality.

2) Effects on Project Timelines

The respondents also observed that surveying inaccuracies may contribute to project delays.

When errors are discovered during construction, corrective works are often required before the next activities can proceed. This affects manpower scheduling, material usage, and project

timelines.

However, PMT respondents also acknowledged that assigning available technical personnel to perform surveying tasks sometimes helps speed up operations when Licensed Geodetic Engineers are unavailable.

This indicates that while the practice may provide short-term operational convenience, it may also create long-term project risks when technical verification is insufficient.

3) Effects on Safety

Several respondents emphasized that inaccurate surveying may also affect structural safety.

Incorrect elevations, improper alignments, and inaccurate positioning may create structural inconsistencies that can affect load distribution, clearances, and dimensional accuracy.

Licensed Geodetic Engineers explained that proper surveying is part of construction risk management because accurate measurements help ensure that structures are built according to approved engineering plans and standards.

4) Legal and Professional Concerns

Most Licensed Geodetic Engineer respondents stated that many surveying activities performed by non-GE personnel fall within the professional scope reserved for Geodetic Engineers under Philippine law.

Respondents emphasized that construction surveying, engineering surveys, and official survey documentation require professional responsibility and accountability.

The findings reveal that there is still limited awareness among some construction personnel regarding the legal limitations and professional requirements related to construction surveying practices.

Several respondents recommended stronger implementation of existing regulations and better coordination between construction firms and Licensed Geodetic Engineers.

The table 6 reveals that the respondents strongly agree that construction surveying activities should be supervised by Licensed Geodetic Engineers, obtaining the highest weighted mean of 4.82.

The respondents also strongly agreed that construction personnel should have greater awareness regarding Republic Act No. 8560 and Republic Act No. 9200.

The findings emphasize the importance of professional accountability, legal compliance, and technical supervision in maintaining reliable surveying practices within construction projects.

Table 5
Assessment on the effects of non-GE surveying practices on construction projects

Indicators	Weighted Mean	Verbal Interpretation	Rank
May affect construction accuracy	4.61	Strongly Agree	1
May increase project rework and corrections	4.48	Agree	2
May contribute to project delays	4.35	Agree	3
May create legal and professional concerns	4.28	Agree	4
May affect structural safety	4.22	Agree	5
May affect project coordination	4.1	Agree	6

Legend

Scale	Verbal Interpretation
4.50 – 5.00	Strongly Agree
3.50 – 4.49	Agree
2.50 – 3.49	Neutral
1.50 – 2.49	Disagree
1.00 – 1.49	Strongly Disagree

Table 6
Assessment of respondents regarding legal and professional concerns

Indicators	Weighted Mean	Verbal Interpretation	Rank
Construction surveying should be supervised by Licensed Geodetic Engineers	4.82	Strongly Agree	1
Construction personnel should be more aware of RA 8560 and RA 9200	4.75	Strongly Agree	2
Survey outputs require proper professional accountability	4.68	Strongly Agree	3
Companies should strengthen quality control procedures	4.55	Strongly Agree	4
Non-GE personnel should receive technical training	4.42	Agree	5

Table 7
Recommended measures to improve surveying practices in construction projects

Proposed Measures	Frequency	Percentage	Rank
Stronger involvement of Licensed Geodetic Engineers	38	95.00%	1
Regular technical training for site personnel	36	90.00%	2
Improved quality control procedures	34	85.00%	3
Standardized documentation procedures	32	80.00%	4
Better coordination among project teams	30	75.00%	5
Regular instrument calibration and maintenance	28	70.00%	6

The respondents emphasized that collaboration among professionals is important to maintain project quality, efficiency, and compliance with engineering standards.

E. Proposed Improvements and Recommendations from Respondents

Table 7 shows that stronger involvement of Licensed Geodetic Engineers ranked first among the proposed improvement measures, with 95% of respondents recommending its implementation.

Regular technical training for site personnel ranked second with 90%, while improved quality control procedures ranked third with 85%.

The findings indicate that respondents highly recognize the importance of professional supervision, technical competency, and systematic quality management in improving surveying practices and reducing project risks in construction projects.

F. Overall Discussion

The results of the study reveal that surveying activities performed by non-Geodetic Engineer personnel are already common practices in construction projects within Region III.

Although these practices help maintain project schedules and operational efficiency, the findings also show several technical, operational, legal, and quality-related concerns associated with insufficient supervision and limited technical expertise.

The respondents strongly emphasized that proper surveying procedures, technical verification, documentation, and professional accountability are necessary to maintain project accuracy and compliance with engineering standards.

The study further highlights the important role of Licensed Geodetic Engineers in ensuring proper survey implementation, quality assurance, and legal compliance throughout the construction process.

5. Summary

This study assessed surveying practices performed by non-Geodetic Engineer personnel in construction projects based on the perspectives of Licensed Geodetic Engineers from Region III and Project Management Team personnel involved in projects.

The findings revealed that non-Geodetic Engineer personnel commonly perform surveying-related activities such as

layouting, elevation checking, gridline establishment, and as-built measurements during construction implementation.

The respondents identified several concerns associated with these practices, including measurement errors, weak documentation, limited technical supervision, and coordination problems. These issues may affect construction quality, project timelines, safety, and legal compliance.

The study also revealed that although assigning available technical personnel to surveying tasks may help maintain project schedules, proper supervision and technical verification from Licensed Geodetic Engineers remain essential to minimize project risks.

Furthermore, the respondents emphasized the importance of professional collaboration, quality control systems, technical training, and compliance with Philippine surveying laws and regulations.

6. Conclusion

The empirical findings and field assessments collected in this study lead to four major conclusions regarding site surveying practices in Region III:

- 1) *A widespread reliance on non-geodetic personnel exists across active job sites.* Site engineers and general technical staff routinely handle core survey operations on a daily basis most notably structural layouting (90.0%), elevation checking (85.0%), and gridline establishment (80.0%). While project managers depend on this arrangement to keep work moving quickly and avoid downtime, the practice directly conflicts with the legal mandates set by Republic Act No. 8560 and Republic Act No. 9200.
- 2) *Delegating layout tasks without direct supervision introduces major quality and operational risks.* The study highlights clear site vulnerabilities, led by frequent measurement errors (87.5%), poor field documentation (80.0%), and a lack of technical oversight (75.0%). These lapses directly compromise overall construction accuracy (WM = 4.61) and push up the likelihood of costly structural rework (WM = 4.48). Ultimately, saving time in the short term often creates significant financial and technical headaches later on.

- 3) *Industry professionals broadly agree on the need for licensed oversight and legal accountability.* Both Licensed Geodetic Engineers and Project Management Team members strongly agree (WM = 4.82) that site surveying requires direct supervision from registered Geodetic Engineers. Stakeholders across both groups recognize that formal professional sign-offs and a better understanding of geodetic laws are essential to protect structural integrity, clarify liability, and stay legally compliant.
- 4) *Current site workflows lack structured quality controls and formal training.* The strong demand for hands-on technical training (90.0%) and standardized quality control procedures (85.0%) shows that field crews currently operate without adequate systematic support. Closing the gap between daily site tasks and legal compliance requires a clear, two-pronged strategy: upskilling field staff through formal training while enforcing routine LGE oversight and regular instrument calibration.

7. Recommendations

Based on these conclusions, the following practical steps are recommended for construction firms, project managers, and industry regulators:

A. Implement the Surveying Practice Enhancement Program (SPEP)

Construction developers and project management teams should adopt the proposed Surveying Practice Enhancement Program (SPEP). This program provides a clear operational framework that defines:

- Which routine layout tasks site staff can handle versus specialized operations that strictly require a Licensed Geodetic Engineer.
- Standardized field verification forms and double-checking protocols before concrete pours or structural installation.
- Systematic maintenance schedules, calibration logs, and quality control procedures for all survey gear.

B. Involve Licensed Geodetic Engineers at Critical Project Milestones

Rather than relying on periodic check-ins, project managers should formally require Licensed Geodetic Engineers to verify key construction stages. LGEs should directly oversee primary baseline control setups, main gridline transfers, vertical alignment checks on high-rises, and final as-built survey

submissions.

C. Provide Continuous Technical Training for On-Site Staff

Contractors should enroll Site Engineers and technical crew members in targeted training programs. Under the guidance of registered LGEs, these sessions should cover proper instrument setup, error-checking techniques, coordinate system fundamentals, and thorough record-keeping practices.

D. Foster Policy Enforcement and Joint Professional Guidance

Regulatory agencies and professional organizations such as the Professional Regulation Commission (PRC), the Geodetic Engineers of the Philippines (GEP), and the Philippine Institute of Civil Engineers (PICE) should actively work together to promote awareness of RA 8560 and RA 9200. Publishing joint guidelines will help clarify roles and improve day-to-day coordination between civil and geodetic engineers on active job sites.

E. Explore New Avenues for Future Research

Future researchers can build upon this study by expanding its geographic scope beyond Region III for comparative insights. Researchers are also encouraged to calculate the direct financial costs associated with survey-related rework, as well as evaluate how emerging geospatial tools such as RTK-equipped drones and Building Information Modeling (BIM) can be safely integrated into modern construction layouts.

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