

An Assessment on the Safety Management Towards Implementation of Construction Projects Throughout the National Irrigation Administration – Upper Pampanga River Integrated Irrigation Systems (NIA-UPRIIS)

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Abstract— This study investigated the safety management practices in the implementation of construction projects at the National Irrigation Administration – Upper Pampanga River Integrated Irrigation Systems (NIA – UPRIIS). The study employed a quantitative approach, utilizing a questionnaire survey to gather data from 35 project-in-charges from different NIA – UPRIIS division offices. The findings revealed that the majority of project-in-charges possess adequate knowledge of construction safety and health protocols. However, there were some areas where safety practices could be improved, such as consistent enforcement of personal protective equipment (PPE) use and conducting thorough risk assessments at every stage of the project. Based on the findings, the study recommends conducting thorough risk assessments, developing comprehensive safety plans, investing in safety training programs, implementing regular on-site inspections, encouraging incident reporting, and establishing effective communication channels to enhance safety performance in NIA – UPRIIS construction projects.

Index Terms— Construction Safety and Health, Project-in-charge, Toolbox Meeting, Irrigation System.

1. Introduction

Infrastructure development towards irrigation systems' existing facilities and structures along with training centers and office buildings maximizes the efficiency and effectivity of water delivery coupled with strategic management and extensive coordination throughout servicing areas of a functioning and operational irrigation network. With the construction industry always beaming relevance in incorporating innovative and climate-resilient frameworks

within the operation and maintenance of existing facilities and structures, it always marks its significance in ensuring to fulfill the commitment of the agency as it paves the way into bringing the principles of inventive construction methodology, augmentation of service through the integration of technology, and sustainability through climate change adaptation.

Beyond the implementation of construction activities and inspection of infrastructure projects relative to the improvement and development of irrigation networks lies the utmost importance of executing appropriate measures to assure safety, health, and welfare among the workers and the inspectorate team and enforcing rules and regulations to prevent unnecessary accidents and disorganized project site that contributes to the delays of daily accomplishment further causing unmet targets and unproductive irrigation water conveyance if not resolved as immediately as possible.

Though provisions from the Occupational Safety and Health Law guarantee that Filipino workers are protected against injury, sickness, or death through employment of safe and healthful working conditions and that their employers must

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engage in promoting strict but dynamic, inclusive, and gender-sensitive measures in the formulation and fulfillment of policies and programs related to occupational safety and health, workers are yet to be involved in the spike of construction-related accidents lodging a considerable percentage of relevant injuries per annum thus mostly led to added onto fatality rates in comparison to other incidents brought by other causes.

2. Review Of Related Literature

Lu (2021) conducted a study aimed at providing updated and detailed information on the current statistics and trends of occupational injuries in the Philippines. Construction work in this study in the Philippines shows between 1,986 to 3,032 cases of occupational injuries and is indeed a hazardous industry. In the Philippines, more than 2 million Filipinos are employed in the construction sector.

In a study administered by Domingo et al. (2015), musculoskeletal disorders comprise 30% of occupational injuries from construction work. All tasks in construction, including chipping, lay-outing, welding, painting, demolishing, shoveling, lifting, grinding, scaffold erection, and hauling, contribute to the body pains of Filipino construction workers. Likewise, construction workers are also exposed to fire hazards that may cause burn injuries. Burns, especially those caused by electrical injuries, are common among construction workers in developing countries.

Domingo et al. (2015) presented the two methods being used to assess the risks associated with construction tasks: subjective assessment through survey and Rapid Upper Limb Assessment (RULA) & Rapid Entire Body Assessment (REBA). From the RULA and REBA results, it can be seen that the most common and most difficult tasks considered in the analysis pose risks to the well-being of the worker. Redesigning of these tasks should be implemented to improve the methods and techniques used and ensure the safety of the construction workers in the country.

A. About NIA-UPRIIS

The National Irrigation Administration (NIA) is a government-owned and controlled corporation primarily responsible for irrigation development and management. Its mandate is to provide irrigation services to the farmer-clientele and stakeholders its serves to improve agricultural productivity and increase farmer's income.

The NIA is mandated to investigate, study, improve, and administer all irrigation systems in the Philippines and investigate, plan, design, and construct all available and possible water resources for purposes of irrigation. In addition, the NIA is mandated to gradually turn over the operation and maintenance of the NIS's secondary canals and on-farm facilities to Irrigators' Associations.

Upper Pampanga River Integrated Irrigation Systems (UPRIIS) is an Integrated Irrigation Systems Office of the agency that supplies irrigation water to most part of the Province of Nueva Ecija and portions of Bulacan, Pampanga,

and Tarlac.

It draws out irrigation water from Pantabangan Dam and other National Irrigation Systems (NIS). The dam was established in 1974, providing efficient irrigation services to more than 150,000 hectares of agricultural lands in Central Luzon.

The UPRIIS Head Office provides the overall supervision of the operations and maintenance of the irrigation systems, covering six (6) division offices including Interim Division VI, as well as the construction of irrigation projects, and restoration and rehabilitation of existing irrigation systems. In line with these functions, the Irrigators' Associations (IAs) are considered valued partners. The distribution and control of irrigation from its main source, the Pantabangan Dam, down to the lowest irrigation area are being efficiently taken care of at various levels.

UPRIIS also administers the implementation of projects intended for the construction, renovation, and improvement of office administration buildings, perimeter fences, farmer's training centers, gymnasium and/or covered courts, motor pools, and other appurtenant facilities aimed to provide a safe and conducive workplace for the employees, to furnish a place for programs, events, and recreational activities, to enable housing for heavy and light equipment, and to meet the needs, through quality service, of the growing clientele - farmer-beneficiaries, related parties and the general public all funded under "Capital Outlay" category.

3. Methodology

A. Research Design

The study incorporates a quantitative approach in determining and analyzing the problems encountered relevant to being descriptive in terms of research design as the description of the characteristics of the population or phenomenon studied is obtained and assessed based on the percentage quantified upon feedback from the respondents throughout questionnaires being given to them that reflect their knowledge, experiences, and practices towards safety management during implementation of construction projects.

The methodology being presented entails the majority of its concepts on finding the corresponding interpretations within numerical data gathered from the responses of the Project-in-charges rather than the implications of its existence and causality. Moreover, the technique of data gathering shall be structured thus the researcher has chosen a quantitative approach for the study. On the other hand, to further study and describe the importance and management of construction safety, the research is suited for a descriptive approach intervention.

Therefore, descriptive quantitative research is fitted to the study considering the outline of the data collection advantage which produces substantial information and data that can be utilized for future research or even developing a hypothesis of

a research object.

Additionally, the quality and integrity of data are secured through the conduct of the research in the respondent's natural environments and field of supposed expertise.

B. Research Locale

The study focused on areas to which ongoing construction projects throughout the service area of the National Irrigation Administration – Upper Pampanga River Integrated Irrigation Systems (NIA – UPRIIS) mainly from Nueva Ecija and some from its neighboring provinces namely: Bulacan, Pampanga, Tarlac, and Nueva Vizcaya take place and are being daily monitored by Project-in-charges employed within each Division Offices established under the NIA – UPRIIS.

C. Population and Sampling

The study brought the entire population of the Project-in-charge of in-progress construction projects implemented by each Division Office of the National Irrigation Administration – Upper Pampanga River Integrated Irrigation Systems (NIA – UPRIIS) to the center of the study as respondents of questionnaires established that reflects the state of safety management based on their knowledge, experiences, and practices on site.

D. Research Instrument

The researcher established and distributed questionnaires administered through Google Forms to gather the suitable and relevant information necessary for the quantitative analysis as part of the assessment of safety management as reflected through the responses of the Project-in-charges on their knowledge, experiences, and practices upon implementation of construction projects. The organized questionnaire was designed to align with the Construction Occupational Safety and Health (COSH) Guidelines in the Philippines (Department of Labor and Employment, 2015). It utilized a structured format to obtain information concerning the respondents' comprehension, engagement, and procedures for executing construction safety management. The survey was transcribed for further evaluation of the information. The target respondents were given a set of essential questions to answer, with a binary choice of "Yes" or "No." The content of the questionnaire was specifically tailored for the assigned Project-in-charges of the implemented construction projects, ensuring its relevance to safety management practices on site.

E. Data Collection

The survey questionnaire manifests the simplest and most directed process in terms of data gathering relevant to a quantitative approach. Following the questionnaire from the respondents comes the formulation of a percentage technique corresponding to each answer to the following questions.

F. Data Analysis

The data obtained and consolidated through the responses

from the survey questionnaires were statistically analyzed with the application of the percentage technique which is utilized for the quantification and calculation of the knowledge gathered in this study predicated on the responses of the determined respondents as it is the most commonly used for the measurement of average percentage corresponding to each detailed answer towards a single question.

The formula to be used was: $\% = F / N \times 100$.

Where,

F = answer

% = percentage

N = number of respondents

4. Results And Discussion

A. Presentation, Analysis, and Interpretation of Data

Table 1. This table shows the number of respondents who answered the survey questionnaire from the NIA-UPRIIS division offices. Five from Division I (14.3%), seven from Division II (20%), three from Division III (8.6%), nine from Division IV (25.7%), six from Division V (17.1%), and five from Division VI (14.3%). Respondents from all division offices are all Project-in-charge. Overall, the results of Table 1 show that there is a good representation of respondents from all NIA-UPRIIS division offices. This suggests that the findings of the study are likely to be generalizable to the wider population of NIA-UPRIIS Project-in-charges.

Table 1. The number of respondents who answered the survey questionnaire from the NIA-UPRIIS division offices.

Division	No. of Respondents	Percentage
I	5	14.3%
II	7	20%
III	3	8.6%
IV	9	25.7%
V	6	17.1%
VI	5	14.3%
Total	35	100%

Table 2 shows the type of project that the respondents monitor. The majority of respondents (94.3%) monitor horizontal projects, while only a small percentage (5.7%) monitor vertical projects. This is consistent with the fact that NIA-UPRIIS is an irrigation agency, and most of its projects are horizontal infrastructure projects such as concrete linings, CHB canals, and PCCP. Table 2 provides valuable insights into the type of projects that are implemented by NIA-UPRIIS. These insights can be used to inform future planning and decision-making by the agency with regards to safety management.

Table 4
The answers of the respondents.

No.	Question	YES	NO	Interpretation
1	Have you undergone any occupational safety and health seminar/s?	29 (82.9%)	6 (17.1%)	The majority of the respondents (82.9%) have undergone occupational safety and health seminar/s. This is positive, as it means that the agency is taking steps to ensure that its employees are aware of the hazards of construction work and how to protect themselves.
2	Is wearing of proper Personal Protective Equipment for both inspectors and workers always ensured while working on site?	27 (77.1%)	8 (22.9%)	Wearing of Personal Protective Equipment (PPE) for both inspectors and workers is being followed on most sites (77.1%). However, there is room for improvement, as 22.9% of respondents said that PPE is not always being worn. The agency should continue to emphasize the importance of PPE and take steps to ensure that it is always being worn on site.
3	Are complete and applicable signages installed and observed on construction site premises all the time?	29 (82.9%)	6 (17.1%)	More than 80% of the respondents say that there are complete signages on site. This is a positive finding, as signage can help to warn workers of hazards and prevent accidents.
4	Do you feel safe and secure within the vicinity of the in-progress construction project?	34 (97.1%)	1 (2.9%)	Most of the respondents (97.1%) feel safe and secure at the workplace. This is a good indication that the agency is creating a safe and healthy work environment for its employees.
5	Are series of toolbox meetings conducted on site prior to the start of any construction activity?	30 (85.7%)	5 (14.3%)	The majority of the respondents (85.7%) conduct toolbox meetings prior to the start of construction. This is a good practice, as toolbox meetings can help to identify and address potential hazards.
6	Are ramps, ladders, and stairways always formed as access whenever excavations over 1.0-meter deep are being established?	27 (77.1%)	8 (22.9%)	Most of the respondents (77.1%) said that ramps, ladders, and stairways are always formed as access whenever excavations over 1.0-meter deep are being established. However, there is room for improvement, as 22.9% of respondents said that this is not always the case. The agency should continue to emphasize the importance of fall protection and take steps to ensure that it is always being used on site.
7	Are scaffolds temporarily installed towards the structure constantly and suitably plumbed and leveled?	29 (82.9%)	6 (17.1%)	82.9% of the respondents answered that scaffolds are installed in projects. Even though horizontal projects do not often include deep excavations, proper scaffolds must be observed.
8	Are appropriate personnel informed of any abnormal conditions, defects, or changes made in machine and/or job procedure conditions when working on heavy equipment?	31 (88.6%)	4 (11.4%)	The majority of the respondents (88.6%) followed protocol of informing appropriate personnel of any abnormal conditions, defects, or changes made in machine and/or job procedure conditions when working on heavy equipment. Even though some answered no, dealing with heavy equipment is an important matter in construction projects and must be handled by appropriate personnel.
9	Have you recently experienced any major accidents on construction site premises?	0 (0%)	35 (100%)	All of the respondents say that they do not experience any major accidents on site. Horizontal construction projects have fewer hazards compared to vertical ones.
10	Is there a first aid kit readily available on site should there be unnecessary major or minor accidents?	29 (82.9%)	6 (17.1%)	Most of the respondents (82.9%) say that they have a first aid kit on site even though some answered no. This is often overlooked in a construction project.

Table 2. The type of project that the respondents monitor.

Project Type	No. of Respondents	Percentage
Horizontal	33	94.3%
Vertical	2	5.7%
Total	35	100%

Table 3. This table shows the number of CY 2023 projects monitored by the respondents.

No. of Projects	No. of Respondents	Percentage
1	13	37.1%
2	7	20%
3	6	17.1%
4	3	8.6%
5	1	2.9%
6	3	8.6%
8	1	2.9%
All	1	2.9%
Total	35	100%

Table 4. This table shows the answers of the respondents. The survey results indicate that the majority of Project-in-charges (PICs) have undergone occupational safety and health training, and most construction sites have complete signages and first aid kits available. Additionally, most PICs feel safe and secure at the workplace, and there have been no major accidents reported. However, there is room for improvement in some areas, such as the consistent use of personal protective equipment (PPE), the proper installation of ramps, ladders, and stairways for excavations, and the consistent conduct of toolbox meetings prior to the start of construction activities. The agency should continue to emphasize the importance of safety and take steps to ensure that all PICs are following safety procedures.

5. Conclusion

The survey results indicate that the majority of Project-in-charges (PICs) have undergone occupational safety and health training, and most construction sites have complete signages and first aid kits available. Additionally, most PICs feel safe and secure at the workplace, and there have been no major accidents reported. These findings suggest that NIA-UPRIIS is taking steps to ensure the safety of its workers.

However, there is still room for improvement in some areas, such as the consistent use of personal protective equipment (PPE), the proper installation of ramps, ladders, and stairways for excavations, and the consistent conduct of toolbox meetings prior to the start of construction activities. The agency should continue to emphasize the importance of safety and take steps to ensure that all PICs are following safety procedures.

Recommendation:

Based on the evaluation of safety management practices in the implementation of construction projects at the National Irrigation Administration – Upper Pampanga River Integrated

Irrigation Systems (NIA – UPRIIS), the following recommendations are put forth to enhance safety performance.

- Conduct thorough risk assessments at every stage of the project, from initial planning to completion. Identify potential hazards and implement preventive measures to mitigate risks.
- Develop safety plans that encompass all aspects of the construction project. Clearly define roles and responsibilities, emergency procedures, and protocols for all activities.
- Invest in safety training programs for all workers including construction workers, contractors, and subcontractors.
- Implement regular on-site inspections to ensure compliance with safety regulations and standards.
- Encourage workers to report safety incidents, near misses, and hazards promptly.
- Establish effective communication channels to disseminate information.

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