

Structural Engineers Career Success

Tomas Ucol-Ganiron Jr, *Member, IACSIT*

Abstract—This study examined the degree to which demographic, job tenure, work experiences and social capital variables predicted career success for structural engineers in the Philippines. Results obtained from 110 structural engineers practitioners who are members of Association of Structural Engineers of the Philippines suggests that job tenure explains the significance variance in extrinsic success in terms of salary level and fringe benefits. Work experiences in design management, managing construction projects and teaching design courses positively predict promotion, but negatively predict career satisfaction. Moreover, job tenure is the best predictor in intrinsic success.

Index Terms—Career success, job tenure, social capital, structural engineer.

I. INTRODUCTION

A career can be defined as the sequence of employment and experiences by a person [1]. This definition means that anyone who works for a living, or intends to, has a career. Career success is of concern not only to individual but also to projects because structural engineer personal success can eventually contribute to construction companies' success. The career literature is replete with theories, models and accounts of career intervention programs aimed at predicting and ultimately facilitating career success. It is also an important outcome in many areas of career scholarship, such as those pertaining to career exploration and decision making.

In addition, a multitude of studies have investigated how variables such as age, age, civil status, job tenure and social capital are empirically related to subsequent career success [2]. By contrast, curiosity little scholarly attention has been devoted to analyze the extrinsic and intrinsic career success of structural engineers.

This research is important, for it will inform the facilitation of pathways and through employment within educational institutions, work places and communities, as well as the socio-political and policy level.

Career success is defined as the extrinsic and intrinsic outcomes or achievements individuals have accumulated from their work experiences [2], [3]. Extrinsic success is defined by verifiable attainments such as salary, fringe benefits and promotions which have long been considered the hallmark of career success across a wide range of societies [3]. However, intrinsic success is defined by an individual's reactions to his or her unfolding career

experiences [3]. Recognition of the importance of intrinsic success dates back at least to Thorndike's operationalization of career success as job satisfaction and career satisfaction [3], [4].

Therefore, in order to examine the relationship, the researcher comes up with this study. First, identify the status of structural engineers in terms of demographic variables, job tenure and work experiences. Secondly, it attempts to determine the level of career success of structural engineer in terms of extrinsic and intrinsic. Third, identify the factors predict the extrinsic and intrinsic success and Fourth, designed a planning program for predictors of career success, which serve as a guide for young structural engineers to be successful that will help them to manage their career in the near future. The aim of this research is to achieve these four objectives by empirical analysis of a specific component of data.

II. LITERATURE REVIEW

A. Definitions of Career Success

Career success can be judged by the individuals pursuing the career, and so it is to consider extrinsic and intrinsic evaluations of career success [4]. Extrinsic success is directly observable, measurable and verifiable by an impartial third party while intrinsic is only experienced directly by the person engaged in her or his career [4], [5].

Intrinsic career success was measured by an individual's intrinsic feelings over what constitutes career accomplishment, career success is a conceptually distinct construct referring to an individual's judgment of their own success evaluated against personal standards, age aspirations and views [4]. Despite the presence of favorable extrinsic career success in the eyes of society or organizations, engineers can still feel alienated from their careers if the perception on intrinsic career success was low.

B. Demographic Variables

The demography of organization's members may influence many behavioral patterns and outcomes including promotion and salary attainment [5]. Thus, demographic variables need to be taken account when investigating the predictors of career success.

One of the most obvious and consistent findings regarding demographic influences is the age positively predicts objective success, presumably because extrinsic outcomes accrue over time [6].

Civil status has been argued to play an important role in career success, especially for women. This reveals that civil status and gender can account for variance of almost 7% in hierarchical level "unpublished" [7]. Some argue that marital status has positive influence on the careers of men and

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T. U-Ganiron Jr was with the Advanced Pipeline Ltd., Onehunga, Auckland, 1061, New Zealand. He is now with the College of Architecture and Engineering, Qassim University, Buraidah, KSA. (e-mail: tomas@qec.edu.sa).

negative influence on the careers of women “unpublished” [8]. Married women who are inactive or minimally active in labor force are perceived as supplementary resources for their male spouses and consequently, are prone to invest in their spouses’ careers [9].

C. Job Tenure and Work Experiences

Research suggests that job tenure and total time in the one’s occupation are positive related to career attainment [9]. Along the amount of experience, type of experience may be relevant in predicting career success. Specifically, it is becoming more important for structural engineers to have managing construction experience.

Moreover, construction companies are more likely to reward and promote structural engineers who have managing construction experience [10].

The work experiences of structural engineer are structural design, design management, managing construction project and teaching structural design courses [11].

D. Extrinsic Career Success

Salary, fringe benefits and promotions are the most widely used and readily accessible indicators of extrinsic career success [12]. These extrinsic measures can have the substantial benefits of being readily available from existing records, standardized at least within firms, and efficient to collect. They are free from self-serving and common-method variance, if collected by means other than self support. They are valued by many engineers and executives [13].

Extrinsic Career Success was measured through four three distinct variables: Compensation (less than P30,000, P51,000 to P60,000, P30,000 to P40,000, P41,000 to P50,000 and more than P60,000); Fringe benefits (salary benefits (salary advance, death benefits, Christmas bonus/other special. disability retirement, bonuses benefits, housing allowance/house rent subsidy, retirement benefits-gratuities, pensions, miscellaneous benefits and paid time off/leave bank; and Promotion(basis of promotion and present position).

E. Intrinsic Career Success

Intrinsic career success most commonly operationalized as job or career satisfaction. Individuals are dissatisfied with many aspects of their jobs, and unlikely to consider their careers to be successful [14].

Job satisfaction is the most salient aspect of intrinsic success. Many other have also used job satisfaction as substitute for intrinsic success. Although job satisfaction may contribute to intrinsic career success, they are conceptually distinct constructs that are not necessarily related [15].

Career satisfaction is most often assessed using the widely adopted career satisfaction scale developed by Greenhaus in 1990. Although such standardized measures generally have acceptable levels of internal consistency, such characteristics are not necessarily sufficient to validly assess each respondent’s subjective career success [16].

Intrinsic Career Success was measured through three (2) distinct variables: Career Satisfaction was measured with the five-item scale developed by Greenhaus which appears to be the best measure available in the literature [16]. Greenhaus (1990) reported an acceptable level of internal consistency

for this scale is 0.88; and Job Satisfaction was measured by the Minnesota Satisfaction Questionnaire (MSQ) generates satisfaction scores for 20 facets [16], [17]. The facets are ability, achievement, activity, advancement, authority, company policies and practices, compensation, co-workers, creativity, independence, moral values, recognition, responsibility, security, social service, supervision-human relations, supervision-technical, variety, and working conditions [17]. The Minnesota Satisfaction Questionnaire has an acceptable level of internal consistency for this scale is 0.91 [18].

III. HYPOTHESES

The following hypotheses were tested in the study:

Ho1: There is no significant relationship between the factors of career success in terms of demographic variables, job tenure and work experiences and level of career success of structural engineers

Ho2: None of the following factors such as demographic variables, job tenure and work experiences predict the extrinsic and intrinsic career success of structural engineers.

IV. RESEARCH DESIGN AND INSTRUMENTATION

A. Research Design

The study used the inferential and descriptive methods of research with questionnaires as the main data-gathering instrument. The subjects of this study were the companies located in the Philippines where vertical and horizontal structures projects are in progress. In 2011, record shows that 187 Structural engineers were employed in public and private firms.

Purposive sampling was utilized in order to determine the participation of the knowledgeable employees only by considering those who meet the five criteria. The criteria are (1) Holder of Civil Engineering degree; (2)Registered Civil Engineer; (3) Minimum of three (3) years of structural design experience since graduation; (4) Two (2) years of significant engineering work; and (5) Member of the Association of the Structural Engineers of the Philippines. Questionnaires were distributed to all structural engineers of the Association of Structural Engineers of the Philippines, Home Development Mutual Fund (PAG-IBIG Fund) with seven (7) branches in Metro Manila, seventeen(17) branches in Luzon, fourteen (14) branches in Visayas; and ten (10) branches in Mindanao. Others were distributed in Corner Steel Corporation in Makati City, Fil Garcia Construction in Quezon City, and DMCI Construction in Manila.

B. Instrumentations

The major tool for data gathering was the questionnaire. The questionnaire was divided into 2 parts. The first part dwelt on the status of structural engineers in terms of demographic variables, job tenure and work experiences. The second part focused on the level of career success of structural engineer in terms of extrinsic and intrinsic success. The final draft of the questionnaire was pretested by an initial group of 7 prospective respondents and their comments and

suggestions were incorporated in the final draft. The initial group however, was not included on the respondent group whom the final questionnaire was administered.

To further ensure the validity of the questionnaire, the researcher read various books regarding institutional relations and corporate values in order to develop appropriate questions and choices. Likewise, the researcher also repeatedly went to the prospective respondents and asked them about the possible questions that could be asked in relation to the research topic.

The researcher also used unstructured interview. It was administered to the respondents to further clarify the opinions reflected in the questionnaire.

The Statistical Package for Social science (SPSS) software was used to generate statistical data to arrive these findings and conclusions. Statistical tests of Regression Analysis, and percentage values were used to enable researcher give appropriate responses to the statement of the problem

V. SAMPLE CHARACTERISTICS

Age: Of the 110 respondents in this study, 48.1% fell within the category of 26 to 35 years old. , 31.9% were 36 to 45, and 20% were 51 years and older.

Gender: 74 or 67.3% were male and 36 or 32.7% were female. Apparently, structural engineers are dominated by male since majority of their work needs climbing the building by using ladder and lifting heavy equipments for testing forensic in structural buildings which is appropriate work for men.

Civil Status: The respondents in this study, 47.3 % were single and 29.1% were married. Very few structural engineers, 12.7 % were widowed and 10.9 % . separated. This shows that structural engineers were dominated by single and married status.

Job Tenure: Many structural engineers, 67.3 % were between 5 to 15 years in the company, 29.1% were less than 5 years and 3.6% between 16 to 20 years in their current company. Most structural engineers are seniors in their current job.

Work Experience: Structural engineers were dominated by worked experience both in design management and managing construction (60%) having less than 5 years work experience in construction industry.

VI. FINDINGS

A. Level of Career Success

Compensation: More than half of the respondents, 59.1% earned an average monthly compensation between P 30,000 to P 50,000. There are also 32.7% earned an average monthly compensation between P 51,000 to more than P 60,000. Generally, structural engineers received high average monthly compensation.

Fringe Benefits: Most of the respondents received Christmas bonus/other special bonus (77.3%), housing allowance/house rent subsidy (68.2%) and salary advance (61.8%) for fringe benefits. Similarly with the compensation received by structural engineers, the level of the fringe

benefits received by structural engineers is highly competitive compared with other professions.

Promotions: Structural engineers are promoted because of their personality traits such as creativity, loyalty, etc. (33.6%) and, experience and background (32.7%). On the other hand, most of the structural engineers, 71% are in the administrative level. The positions of the respondents in the administrative level are: Construction Manager (28.2%), Project Manager (27.3%) and Vice President (15.5%). Therefore, majority of administrative level in construction industries are occupied by structural engineers and most of them are promoted because of their very high positive personality traits, experience and backgrounds.

Career satisfaction: Respondents perception that structural engineers "strongly agree" that they are satisfied with their career with a mean composite response of 3.79 .In general, the level of career success for structural engineers in terms of career satisfaction was very satisfied.

Job satisfaction: This was "strongly agree" by the structural engineers with a composite mean response of 3.83. In general, the level of career success for structural engineers in terms of job satisfaction was very satisfied.

B. Predictors of Career Success

Extrinsic Success: The multivariate regressions predicting extrinsic career success (compensation, fringe benefits and promotion) are provided in table I. As the table indicates, each set of hypothesized variables (demographic, job tenure and work experiences) explained a significant variance in pay and promotions.

Variables such as age, job tenure, work experiences in design management, managing construction, teaching design subjects and have obtained R^2 0.169, 0.180, 0.161 and 0.137 to compensation and computed significant values are below at 0.05 level, the H_0 is rejected indicated significant variance to compensation.

Moreover, age, civil status and design management experience rating have obtained R^2 0.212, 0.161, 0.247 and 0.135 to fringe benefits and computed significant values are below at 0.05 level. The finding shows significant variance to fringe benefits

The age, civil status, job tenure, work experiences in structural design, design management, managing construction and teaching design subjects have obtained R^2 0.160, 0.146, 0.133, 0.211, 0.211 and 0.195 to promotion and significance values below at 0.05 level. The finding shows significant relationship to promotion.

It could be inferred that work experiences in design management, managing construction and teaching design subjects can best predict extrinsic success in terms of promotion. On the other hand job tenure can best predict extrinsic success in terms of fringe benefits and compensation.

Intrinsic Success: Variables such as age and teaching design subjects experience have obtained R^2 0.161 and 0.156, to career satisfaction and computed significant values are below at 0.05 level, the H_0 is rejected indicating significant variance to career satisfaction.

Moreover; gender, job tenure and structural design experience have obtained R^2 0.141, 0.725 and 0.170 to job

satisfaction and computed significant values are below at 0.05 level, the Ho1 is rejected indicating significant relationship to job satisfaction.

It could be inferred that job tenure can best predict intrinsic success in terms of career satisfaction and job satisfaction.

TABLE I: PREDICTORS OF EXTRINSIC CAREER SUCCESS BY DEMOGRAPHIC VARIABLES, JOB TENURE AND WORK EXPERIENCES

Factors of Career Success	Extrinsic	Beta	R ²	Sig.
Age	Compensation	0.314	0.169	0.014
	Fringe Benefits	0.450	0.212	0.000
	Promotion	0.389	0.160	0.001
Gender	Compensation	-0.081	-0.003	0.401
	Fringe Benefits	0.003	-0.009	0.977
	Promotion	-0.003	-0.007	0.608
Civil Status	Compensation	0.114	0.004	0.236
	Fringe Benefits	0.410	0.161	0.000
	Promotion	0.232	0.146	0.012
Job Tenure	Compensation	0.283	0.180	0.003
	Fringe Benefits	0.497	0.247	0.000
	Promotion	0.296	0.120	0.020
Structural Design Experience	Compensation	0.101	0.010	0.292
	Fringe Benefits	0.088	0.088	0.363
	Promotion	0.363	0.133	0.001
Design Management Experience	Compensation	0.248	0.161	0.009
	Fringe Benefits	0.188	0.135	0.048
	Promotion	0.440	0.211	0.000
Managing Construction Experience	Compensation	0.245	0.161	0.009
	Fringe Benefits	0.128	0.007	0.181
	Promotion	0.445	0.211	0.000
Teaching Design Experience	Compensation	0.205	0.137	0.024
	Fringe Benefits	0.139	0.009	0.148
	Promotion	0.434	0.195	0.000

TABLE II: PREDICTORS OF INTRINSIC CAREER SUCCESS BY DEMOGRAPHIC VARIABLES, JOB TENURE AND WORK EXPERIENCES

Factors of Career Success	Intrinsic	Beta	R ²	Sig.
Age	Career Satisfaction	0.411	0.161	0.000
	Job Satisfaction	0.095	0.001	0.322
Gender	Career Satisfaction	-0.042	-0.008	0.666
	Job Satisfaction	0.224	0.141	0.019
Civil Status	Career Satisfaction	0.041	-0.075	0.004
	Job Satisfaction	-0.179	0.175	0.002
Job Tenure	Career Satisfaction	0.319	0.009	0.007
	Job Satisfaction	0.534	0.725	0.002
Structural Design Experience	Career Satisfaction	0.030	0.001	0.754
	Job Satisfaction	-0.264	0.170	0.001
Design Management Experience	Career Satisfaction	0.144	0.021	0.134
	Job Satisfaction	-0.002	0.002	0.821
Managing Construction Experience	Career Satisfaction	0.121	0.015	0.208
	Job Satisfaction	0.003	0.001	0.978
Teaching Design Experience	Career Satisfaction	0.237	0.156	0.017
	Job Satisfaction	-0.181	0.033	0.058

VII. PLANNING MODEL FOR CAREER SUCCESS

A. Job Tenure

This is typically measured by the length of time structural engineers have been in their current job or with their current employer. Result in table I and II show that job tenure contributes in extrinsic success in terms of compensation and fringe benefits, and intrinsic success in terms of career satisfaction and job satisfaction. To become secure in a job and stay longer in an organization, figure 1 shows a model that will help structural engineers to become a better, more visible employee to win the favor of their project managers, construction managers and coworkers. First, structural engineer should be a visible part of the team. In meetings, he should always participate, give his best advice and ask

intelligent questions that show that he is paying attention. If needed, he should arrive early and stay late. Secondly, structural engineer should be proactive. He should always be on the lookout for ways that he can go above and beyond his job description. This shows not only that he is ready to move a step up, but also that he is committed to the company. Third, structural engineer should act professionally. He should resist the temptation of office gossip, and make sure all conversations are appropriate. Fourth, structural engineer should accept challenges with enthusiasm, and always stay positive. Fifth, structural engineer should express his commitment to his work by always wanting to learn more. Sixth, structural engineer should be easy to communicate and interact with. They should smile and avoid negativity. Seventh, structural engineer should minimize company expenses. This shows his boss that he is conscious of the company goal to make a profit and that he can help drive that profit and lastly, structural should pay attention to his looks. He should follow the company culture and guidelines, and dress appropriate for his position.



Fig. 1. Planning model for job tenure.

B. Design Management

Design management is a work experience of structural engineer that encompasses the ongoing processes, construction business decisions, and strategies that enable innovation and create effectively-designed structural members, services, communications, environments, and brands that enhance the quality of life and provide organizational success. Result in table 1 shows that design management experience is a predictor of extrinsic success in terms of promotion. As shown in figure 2, this model will help structural engineer in managing the design process, and are relevant to a lesser or greater extent when working with creative people and providers of all sorts, from design and advertising agencies, product designers, branding and image consultants, to creative people providing design services for building and renovation, and other creative services relating to domestic, house and home, lifestyle and personal image. In this model, once a design team has been agreed upon and assembled, the owner needs to coordinate and manage the

project's design phases. Design management requires the oversight of schedules and budgets; review of key submissions and deliverables for compliance with program goals and design objectives; verification of stakeholder input for inclusion; verification of construction phase functional testing requirements; and appropriate application of the owner's design standards and criteria. This stage should also define the criteria for assessing quality measurement to ensure the project's success. Determining appropriate goals and objectives at the beginning of the process, during a visioning session, and measuring their implementation over the life cycle of building and construction has been proven to increase overall building quality and reduce project costs and timing to delivery.

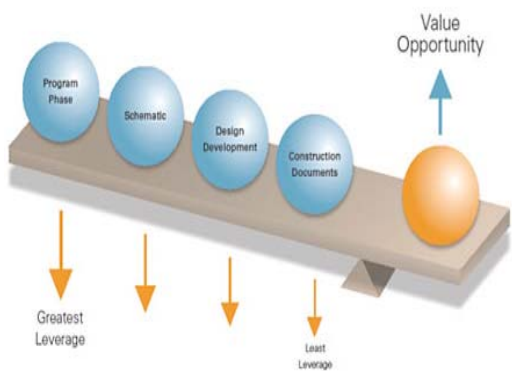


Fig. 2. Planning model for design management.

C. Managing Construction Project

Managing construction project is a work experiences that focuses on each part of the construction process of any built environment. This typically encompasses commercial building sites or multi-unit residential sites, but not usually single-family residential building sites. Based in table 1, managing construction project contributes in extrinsic success in terms of promotion.

As shown in figure 3, this model will help project managers successfully manage construction projects of all kinds. Before structural engineer start executing a construction project, he should spend an appropriate amount of time planning so that he will have a good idea of what he is doing. In this model, the two components are defining the work and build the schedule and budget. The major deliverables are project charter, project management plan, schedule and budget. The planning process is generally executed at the beginning of the project but the documents created should be updated continually during the project. Once a structural engineer has the planning work completed, it is time to start executing the project. To execute the construction project, structural engineer need to proactively manage the work. These are project management activities. In this model, there are eight components: manage the schedule and budget, manage issues, manage scope, manage communication, manage risks, manage human resources, manage quality and metrics, and manage procurement. These components are not performed sequentially but instead are performed in parallel as needed throughout the remainder of the construction project.

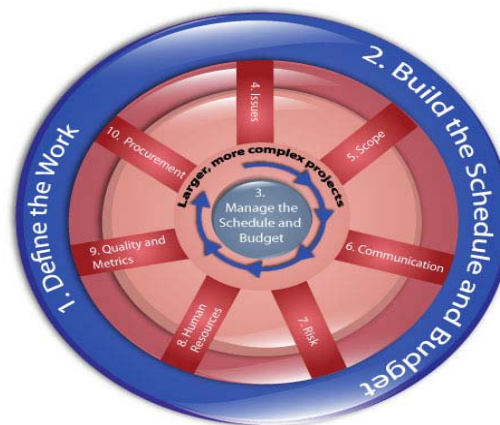


Fig. 3. Planning model for managing construction project.

D. Teaching Design Course

Teaching design course is a work experience of structural engineer that is noble profession and develop professionalism and continuity in learning and innovation. A professor or lecturer usually handled design courses pertain to Structural Analysis, Wood and Timber Structures, Steel and Metal Structures, and Reinforced and Prestressed Concrete. Based in table I, teaching design course is a predictor of extrinsic success in terms of promotion. To become more effective as a lecturer or professor in teaching design course, the researcher made a model as presented in figure 4. This covers the aspects of reflective practice, education theory, teaching technologies and instructional design.

Understand. In the first stage, instructor should investigate the learning scenario. Start by identifying a problem that instruction can solve by asking, “What is the challenge learners face, and how can he help them meet it?” This is followed by analyzing the scenario, which involves considering the conditions and constraints of each element of instruction: learner, content, context, and educator. Listing these specifics provides insight into who is the lecturer audience, what he need to know and how the learning environment can be shaped to facilitate a positive learning experience.

Structure. Next, define what lecturer want learners to accomplish and outline the strategies that he will use to present active and learner-focused content. Begin by creating targets like goals, objectives, and outcomes that help lecturer streamline his content and activities and evaluate whether learning has occurred. Identify methods that involve learners using delivery techniques, technologies, and activities; and extend the interaction by supporting engineering students along the continuum of learning.

Engage. Subsequently, instructor should create his instructional objects and participate in the learning interaction like develop the materials of instruction, e.g., the syllabus, outline, handout, lesson plan, and/or course guides in a live interaction; or the storyboard, game, website, or tutorial in a web-based interaction.

Reflect. Finally, instructor should consider whether learning has occurred and how lecturer might improve his instructional product. Lecturer has to assess his impact by determining whether participants have met the desired

performance targets and consider how lecturer might revise and reuse his content in the future.

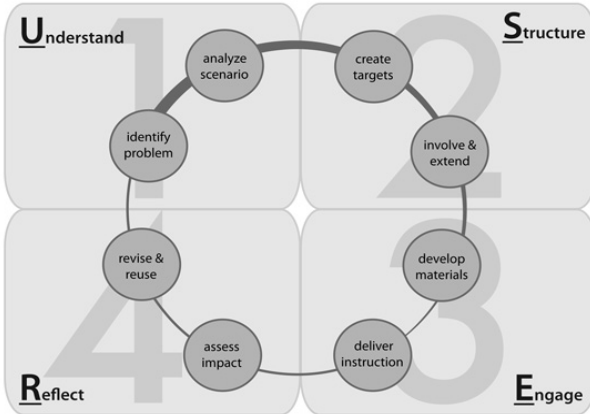


Fig. 4. Planning model for effective teacher in structural design courses.

VIII. CONCLUSION

It can be concluded from this investigation on structural engineers that it is indeed a measure on the state of mind held by the structural engineers as to the level of career success in intrinsic success are very satisfied. Despite work experiences in design management, managing construction project and teaching design courses can best predict extrinsic success in terms of promotion; it was job tenure had significant impact in extrinsic success and intrinsic success. This indicates that structural engineers define their career success by evaluating extrinsic and intrinsic components. To ensure structural engineers will stay long in construction industry, the contractors must develop formal mentoring programs for new structural engineers within construction organizations and encourage senior members of the company to mentor junior members (e.g., new graduates) upon their entry to the industry to help them navigate company policies and expectations as well as larger industry experiences. They should make the hiring and career development of structural engineers a priority of senior management and create a culture within the company that the people employed are the most important factor in the performance and profitability of the construction companies. Moreover, they should provide a diversity training of all structural engineers. This includes code of ethics.

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Dr. Tomas Ucol-Ganiron Jr. obtained his Doctor of Philosophy in Construction Management at Adamson University (Philippines) in 2006, and subsequently earned his Master of Civil Engineering major in Highway and Transportation Engineering at Dela Salle University-Manila (Philippines) in 1997 and received Bachelor of Science in Civil Engineering major in Structural Engineering at University of the East (Philippines) in 1990. He is a registered Civil Engineer in the Philippines and Professional Engineer in New Zealand. His main areas of research interest are construction engineering, construction management, project management, highway engineering, transportation engineering and structural engineering. He has been a resource person in various seminars in New Zealand (like in Auckland University of Technology, University of Auckland and University of Canterbury). He was connected with Advanced Pipeline System in New Zealand as Construction Manager wherein he supervised the sewerage and waterworks projects. He was the former Department Head of Civil Engineering in FEATI University (Manila) and former Department Head of Physics in Emilio Aguinaldo College (Manila). He also had teaching stints at the College of Engineering in Auckland University of Technology, New Zealand and at the MAPUA Institute of Technology (Manila). He is currently the Professor at Qassim University (KSA) College of Architecture and Engineering. Dr. Ganiron Jr is a proud member of professional organizations like the Institution of Engineers-Australia and American Society of Civil Engineer. He is also very active in other professional groups like Railway Technical Society of Australasia and Australian Institute of Geoscientists where he became committee of Scientific Research. He has given invited or keynote lectures at a number of international conferences and has received the ASTM Award CA Hogenogler for 2008.