



### Abstract

The research project focuses on the implementation of Lean Construction in two construction companies where each owner belongs to a different generation. Company A belongs to the Baby Boomer generation while Company B the owner belongs to generation "X" and I, the assistant project manager, belonging to generation "y". So this project studies the generational shock and the different visions that each generation has with reference to work ethics and how this affects the management of a company when applying new methodologies to improve its efficiency. Using the principles of Lean Construction and knowing the characteristics of each generation, I will develop an implementation guide for the construction and management processes involved in a construction company and that it be more efficient in terms of profits, process identification, definition of roles, reports and above all the constant communication between owner, employee and client.

### Introduction

As the years go by the construction industry continues to grow and innovate by applying the new technologies and products created. Where the initial objective of each construction company should be to execute each project perfectly and without loss acquiring the estimated profit; but we know that this is not always the case given that during a construction project changes occur at the last minute or variables beyond the control of the contractor. But how to prevent or anticipate it? One of the most accurate methods to meet these objectives is the Lean Construction Methodology; It helps to restructure the production management system of a company to eliminate losses in the production process. This research project will be focused in the implementation of Lean Construction methodology based on the generation gap in construction companies.

### Problem Statement

The construction industry has existed since before the Roman Empire, where it has evolved according to technological advances and the needs of the human being. With the purpose of improving the quality of life and improving the efficiency of construction processes. Composed of three essential elements: the architect, the engineer and finally the contractor who work hand in hand to be able to carry out the construction work. Some of the factors for a construction project to be successful and have profits are documentation, efficiency and organization. Some small construction companies lack these factors either due to lack of employees, lack of knowledge or generation gap. But what happens when the generation gap affects the growth of a construction company?

### Background

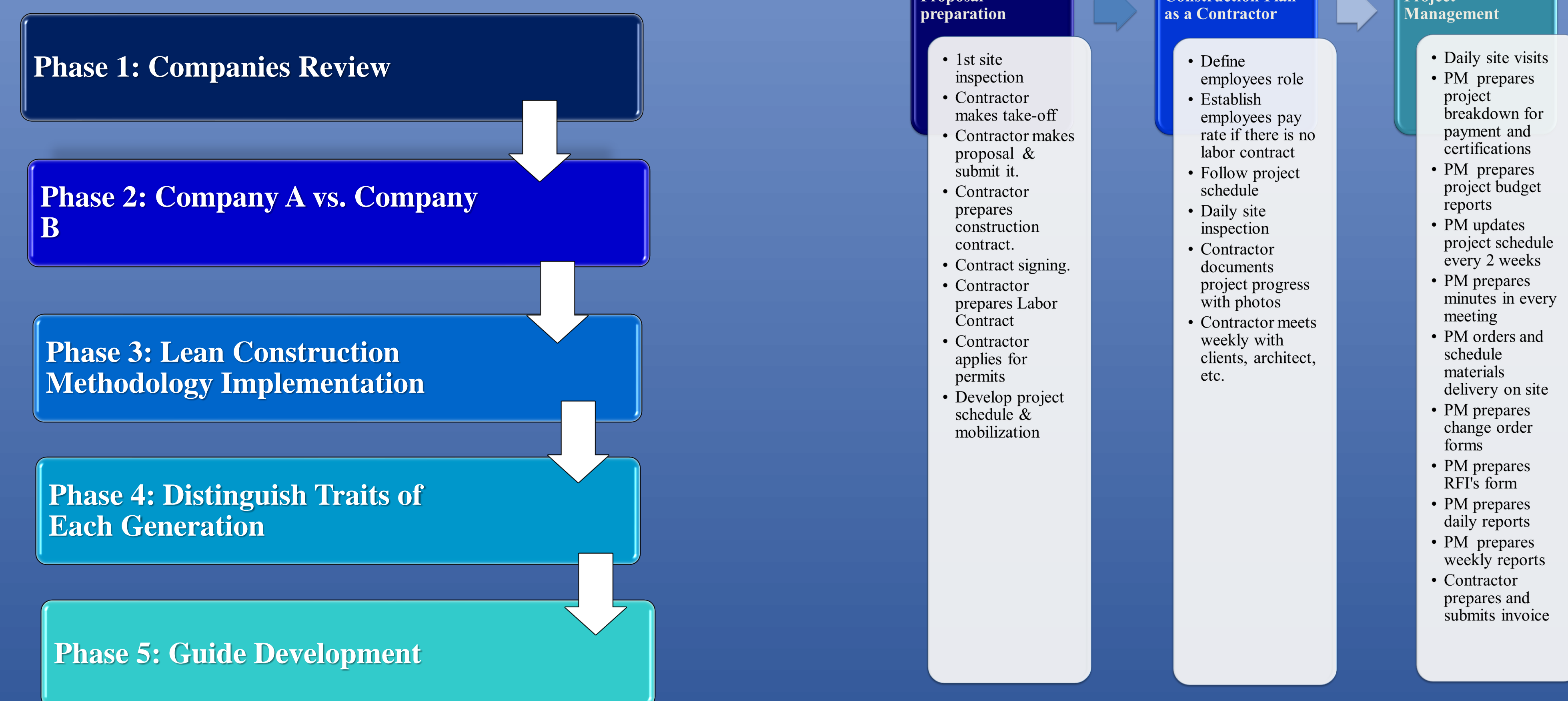
In order to apply the methodology of "Lean Construction" in a construction company we must consider the type of generation that directs it. We must ask ourselves this question; Is the multigenerational shock affects the work environment? Several studies have revealed that this situation mostly affects the operation of a company.

### Background cont.

With this data in mind, we investigate the characteristics of the last three generations (Baby Boomers, Generation X & Generation Y) in the world of work. What characterizes them? What is your work ethic? What defines you as a person? & What is your learning method? In order to apply the Lean construction method in a company. While Lean Construction has existed for more than fifteen years. At the same time the five lean principles as outlined by (Womack, James P. & Jones, Dan, 2003) have gained a firm foothold in the manufacturing & construction industries. These principles are: 1. Precisely specify value by specific product. 2. Identify value stream for each product. 3. Make value flow without interruptions. 4. Let the customer pull value from the producer. 5. Pursue perfection. As every generation is unique in its way, it can bring problems in the advance of the company. Sometimes the lack of knowledge or fear of the unknown can hold back leader when the time comes for the implementation of new methods in the awakening of technologies. This can be a challenge when it comes to managing three generations at work. (Lieber, L.D., 2010) states the generational diversity brings an array of experiences and perspectives to the workplace. Yet, managing and working with members of different generations can also create workplace challenges because of different generations' needs, approaches, and expectations.

### Methodology

Occupying a position as assistant project manager for two small construction companies in Puerto Rico I have been able to observe the lack of organization and structure to establish a safe and successful process when managing a construction project. Given that the owners of each company belong to different generations, each one has different methods of how to manage their company. According to (Koskela, Lauri, 2000) it is important to visualize a construction company as a production where the project must be managed as a product and it must be completed to perfection. To carry out this research I will be dividing the process into five phases:



### Results & Discussion

❖Phase 1: Company A is run by an entity belonging to the "Baby Boomer" generation which has more than thirty years of experience in general construction. The same company was established in 2013 and has 3 superintendents, 20 labor employees and an accountant. The company specializes in construction of residences, restaurants, shopping malls, gyms, and electrical and mechanical work. On the other hand, company B is run by an entity belonging to the "x" generation which has more than fifteen years of experience in general construction. The same company was established in 2009 and has 2 superintendents, 8 labor employees and an accountant. The company specializes in construction of residences, restaurants, shopping malls, structural repairs, design & build, project management and real state.

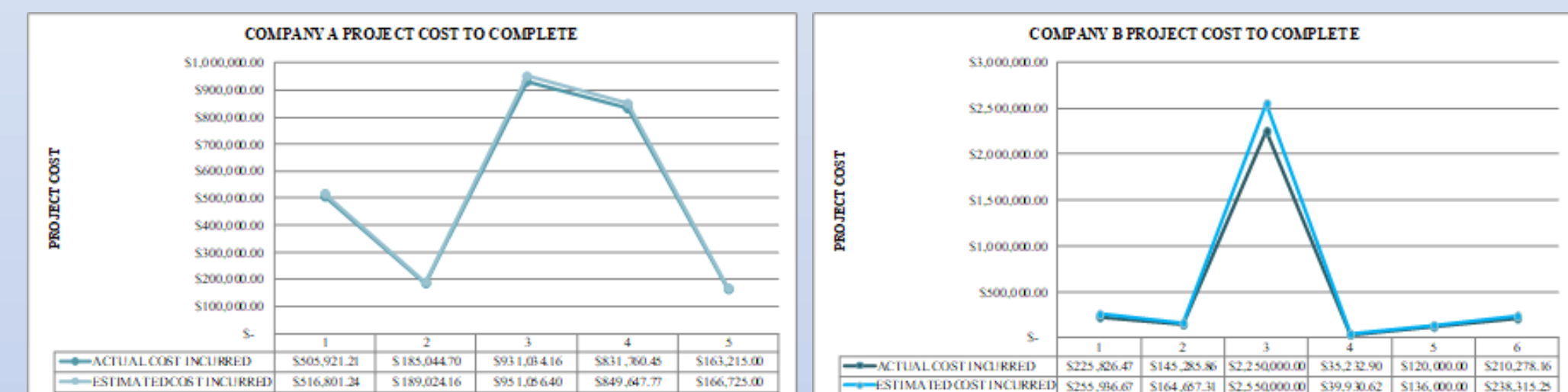
Activity	Company A		Company B	
	Yes	No	Yes	No
<b>A General Construction</b>				
A.1 Contractor makes first site visit	X		X	
A.2 Contractor prepares take-off		X	X	
A.3 Contractor prepares cost estimates		X	X	
A.4 Contractor prepares bid-proposal	X		X	
A.5 Contractor prepares construction contract		X	X	
A.6 Employees are skilled in structural steel works		X		X
A.7 Employees are skilled with concrete works	X		X	
A.8 Employees are skilled with masonry work	X		X	
A.9 Employees are skilled with electrical works	X		X	
A.10 Employees are skilled with plumbing works	X		X	
A.11 Employees are skilled with gypsum work	X			X
<b>B Design &amp; Build</b>				
B.1 Structural design		X	X	
B.2 Architectural design	X		X	
B.3 Electrical design	X		X	
B.4 Mechanical design	X		X	
B.5 Plumbing design	X		X	
B.5 Site design	X		X	
<b>C Project Management</b>				
C.1 Contractor submits permits	X		X	
C.2 Contractor prepares weekly reports		X	X	
C.3 Contractor develops project schedule		X	X	
C.4 Contractor prepares budget reports		X	X	
C.5 Contractor prepares payroll reports		X	X	
C.6 Contractor makes daily site inspections		X	X	
C.7 Contractor makes payment certifications		X	X	
C.8 Contractor prepares invoices	X		X	
C.9 Contractor submits invoice	X		X	

Table 1: Company A vs. Company B construction activities

Table 1 presents the witch activities each contractor performs in a construction project. As I collected the data in phase 2 I could establish their process and identify in which area they were lacking.

❖Phase 3: Using the methodology of Lean Construction and following the principles established by (Womack, J. & Jones, D., 1996); precisely specify value by specific product, identify value stream for each product, make value flow without interruptions, let the customer pull value from the producer & finally pursue perfection.

### Results & Discussion (cont.)



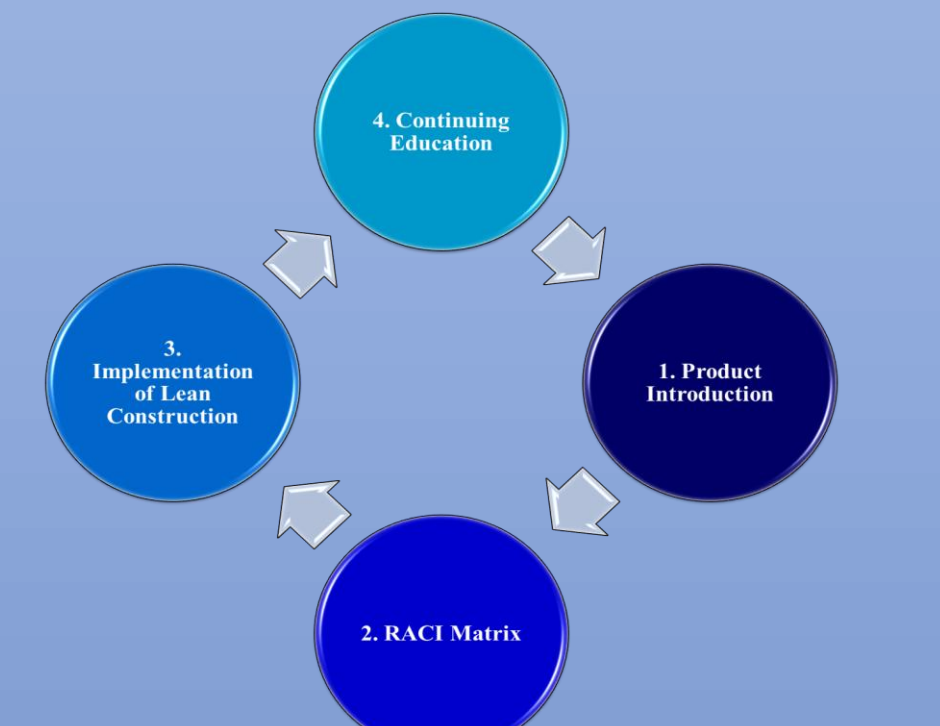
Given that the contractor A refused to use the lean construction principles, he only generated 7% of the profit versus 20% which was the goal. Using the percent adjustment and applying the lean construction principles accepted by the contractor B, it was possible to observe a 5% increase in profits, generating 20% instead of 15%.

Work Ethic	Baby Boomers	Generation "X"	Generation "Y"
How generations view their relationship with the organizations?	Tend to be more loyal to their team than to the organization. They believe in adding value by going the extra mile and can have a "live-to-work" mentality. "Fight-your-way-up-the-corporate-ladder" mentality.	Are primarily loyal to their supervisors. They can exceed expectations and deliver results. "Work-to-live" attitude. Focus on their own professional career ladder.	More likely to feel loyalty to their peers than to management or the organization itself. Want to ensure equitable treatment of all. They are more likely to have a "work-to-contribute" philosophy.
How they relate to authority?	Tend to challenge authority, desiring "flat" organizations that are more democratic. "Let me show what I can do for you."	Unimpressed with authority. Their attitude toward management can be more in line with "Tell me what you can do for me."	Evaluated at an individual level rather than according to a predetermined policy. Tend to have high expectations of employers in terms of benefits, flexibility, and compensation.
What work style defines them?	Work best in structured environments, but are willing to challenge the rules when they feel it is necessary. They equate change with caution and are people-focused, preferring to work as a team. Sees change as opportunity.	Flexible, rule-changing, and results-focused. They prefer to work independently, with little supervision.	Has a unique, flexible work style that many managers may find challenging. They value fluidity in the workplace.
What are the management styles based on each generation?	Are participative managers. Always aware of workplace politics. Making management decisions based on consensus. Tend to follow the latest management trends, books, and theories.	Collaborators. Tend to favor performance-based management. Making management decisions based on consensus. Their attitude is often "Do what we need to do to get the results."	Tends to be hyper-collaborative as managers. Using a personal approach and encouraging team members to do what they are best at. They are proponents of just-in-time management and do not like to interfere. They prefer to let employees have free rein.

Table 2: Phase 4 – Distinguish Traits of Each Generation

### ❖Phase 5: Guide Development

1. Product Introduction
2. RACI Matrix
3. Implementation of Lean Construction
4. Continuing Education



### Conclusion

The implementation of Lean Construction in both companies was carried out for a period of one year where it was observed that company A led by a Baby Boomer increased 2% of the original profits for each project given that the same owner of the company resisted the implementation of this methodology. On the other hand, company B led by generation "x" increased 5% in the production of profits, obtaining in the end 20% of profits in each project; given the availability of implementing this methodology. Where it helps to establish the processes and identifies in advance the possible problems that could happen throughout a project using itineraries and reporting formats in a project.

### References

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Figure 1: New Process applying Lean Construction Method