SCOPE AND IMPACT OF IMPLEMENTING LEAN PRINCIPLES & PRACTICES IN SHIPBUILDING

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Abstract

Lean Principles and Practices claim to create value for customer with growth for every type of organization where it is implemented\textsuperscript{[1]}. Therefore, the researchers attempt to study and verify scope and impact of implementing Lean in Shipbuilding. The Shipbuilding technology differs from those deployed elsewhere such as automotive products. However it can be considered in many aspects similar to Construction technology where the product is place-bound and the site itself is a resource\textsuperscript{[2]}. Survey and analysis of selected articles pertaining to lean shipbuilding together with available primary data, observations, and experience shared by experts in the field – form the basis of this research work. A popular citation states, “The available literature on implementation of lean in shipbuilding environment is quite restricted due to novelty and the restriction of the concept. Lean shipbuilding is very specialized one and its application is considered to be one of the extensions beyond Lean Construction”\textsuperscript{[3]}. Our approach has been to search answers to questions that a professional engaged in shipbuilding may ask such as: What does the term ‘Lean’ mean? How is Lean applied? Are there any apparent limitations to the application of Lean in shipbuilding? Where are the examples of best practices of Lean in shipbuilding? These questions guided the research work leading to a key finding. Data analysis of market share claimed by best in the field like Japan compared to immediate rival South Korea prompted to study the success methodology adopted there. On the other hand comparison of shipbuilding productivity in terms of man hours per ton was analyzed to find opportunities for improvement at low ranking shipbuilding yards in other parts of world where 2 to 10 times higher man hours are consumed compared to the best in the field\textsuperscript{[4]}. Special emphasis was made to study situation in Indian Shipbuilding companies in the context of new Government policies and world class Lean automakers like TATA and Mahindra entering into the shipbuilding trade. Advantages like lowest pay rate of labor in this labor intensive industry together with demand of commercial and multi role ships are likely to be explored fully in immediate future as reported in Global Conference and Exposition on shipbuilding by KPMG and FICCI\textsuperscript{[5]}

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1. Objectives

Study scope of implementing Lean principles & practices in shipbuilding. This study is divided in four parts as follows:

1.1. Problem description

To find description of large number of problems in shipbuilding trade lowering its performance as:

- Project objectives not defined well or not communicated effectively.
- Lack of multi-skill training resulting in ‘too many workers and too many trades in shipyard’.
- Lack of Standardized work and tasks.
- Cross-functional team does not exist and that results into poor coordination among design, planning, material, and production in the shipyard.
- Excess manpower deployment.
- Lack of transparency to enjoy undesired flexibility.
- Corrupt practices in inspection results in repetitive defects at advance stage [6].
- No provision for immediate repair of defect when found [2].

1.2. Lean Principles & Practices

To acquire deeper understanding of the Lean Principles & Practices so as to select suitable Lean tool to prevent the above listed problems. To understand that Lean Manufacturing is a strategy that aims at high level of performance using lesser effort, time and material. Lean eliminates waste and non-value-added activities from the entire cycle of operation. The principles of lean encourage and improve; team work, communication, efficient use of resources, and continuous improvement. As a system it provides better and more cost effective product, higher productivity, and greater customer loyalty. Lean production is lean because it uses less of everything. Characteristic of lean manufacturing is to; (i) produce goods with a few people (ii) with a little inventory and as little waste possible (iii) provide material at every stage of process exactly – what, how much, and when required (iv), allow variety in product without change-over cost. Lean covers every function of the organization like; Marketing, Purchase, Quality, Production and so on. Small scale units producing high quality good at lower cost than large factories are example of Lean production [7].

1.3. Implementation of Lean Principles & Practices

To find implications related to the implementation of Lean practices like FIVE ‘S’, KAIZEN, Value-Stream – Mapping, Standardized Work, Mistake Proofing, Continuous flow of work etc. in shipbuilding.

1.4. Examples of best practices

To study examples of best practices of Lean in shipbuilding and to find how other shipbuilding industries can respond to the need to apply these principles.

2. Definition of Research Problem

The shipbuilding industry in most part of the world, has not yet responded to lean manufacturing principles and practices. This research attempts to find description of problems responsible for lower performance there. The approach is adopted also to search answer to the questions framed and noted in the abstract above.

- Project objectives not defined well or not communicated effectively to work force. Group structure is not cohesive internally although externally it might give different impression under corporate name and logo. Contrast to the lean principles, the customers and suppliers also get minimum information as regards process and cost. The cause for such situation is traced to shipbuilder’s fear to lose confidentiality and
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