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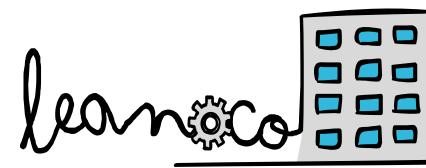
**Warsaw University  
of Technology**

# LEAN CONSTRUCTION



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# 1.Introduction



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The LeanCo project aims to develop and implement a new Professional Training program, specialized in the training of Lean Construction methodology, for professionals in the construction sector, to provide them with the necessary knowledge and specific skills to apply and implement the approach of such methodology within companies.

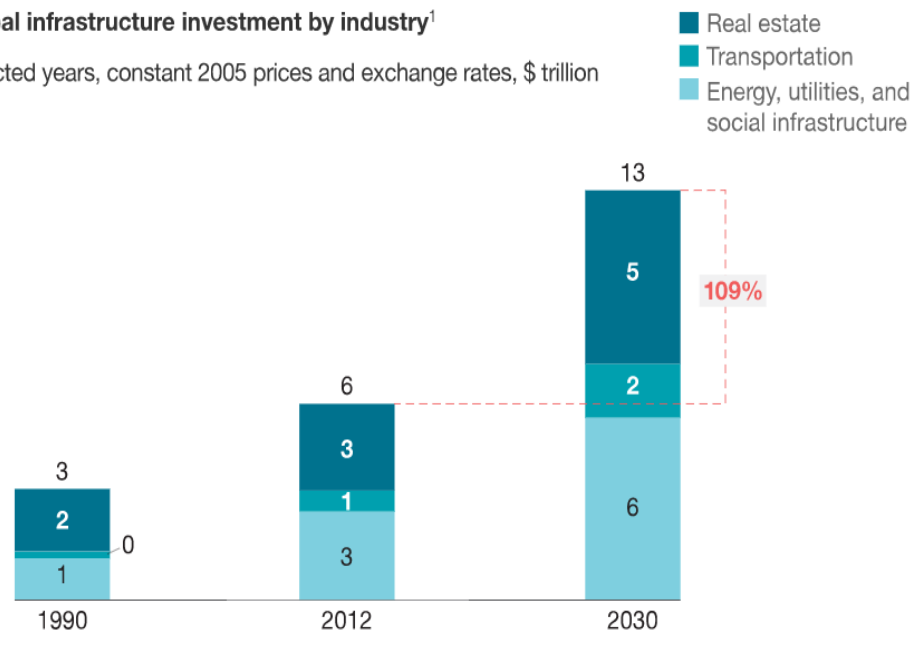
This document, develop some important information and data about the Lean Construction main tools and methodologies, to have a complete material to teach this system, in addition to this, it's necessary add some practice activities and some test with questions to evaluate the success of the material.



# Construction Industry

## Global infrastructure investment by industry<sup>1</sup>

Selected years, constant 2005 prices and exchange rates, \$ trillion



## Megaprojects' share in the future<sup>2</sup>

12% by number of projects  
77% by project value

<sup>1</sup>Forecast assumes price of capital goods increases at same rate as other goods and assumes no change in inventory.

<sup>2</sup>Project award date 2015 and beyond.

–The construction industry is one of the most important economic sector around the world, according to the Bureau of Labor Statistics (BLS), U.S. Department of Labor, the value of construction in 2006 was \$1,260.128 billion, representing 8% of the gross domestic product (GDP) The industry employed approximately 7.614 million people

# Construction Productivity

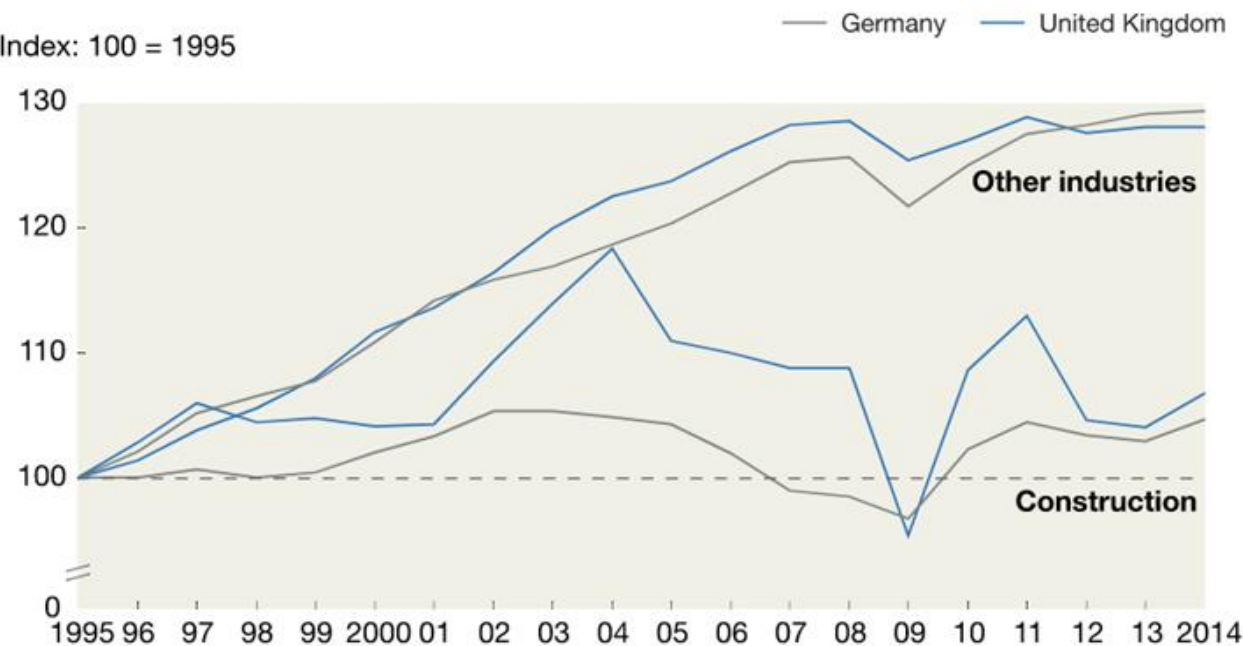
Construction productivity in history always had low levels, according to the BLS, during the past 40 years, the productivity of non-farm industries has increased by over 100%.

an article titled "Construction and the Internet" in The Economist, dated January 15, 2000, noted that up to 30% of construction costs is due to inefficiencies, mistakes, delays, and poor communications.

Construction-labor productivity in Germany and the United Kingdom has not kept pace with other industries.

Labor productivity (gross value added per hour worked, constant prices<sup>1</sup>)

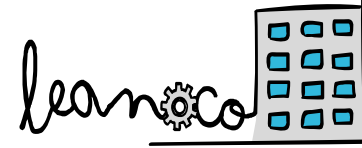
Index: 100 = 1995



# Construction Wastes

Researches have revealed that considerable amount of losses lies in flow processes of construction not machinery or material these wastes in flow processes of construction such as 'non-conformance quality costs' consume 12% of total project cost; 'poor materials management' causes 10- 12% of total labor cost; 'time used for non-value-adding activities' Thus, the value hindrance by wastes in flow processes of construction is quite evident that's why emerge the necessity to implement a concept such as Lean Construction.





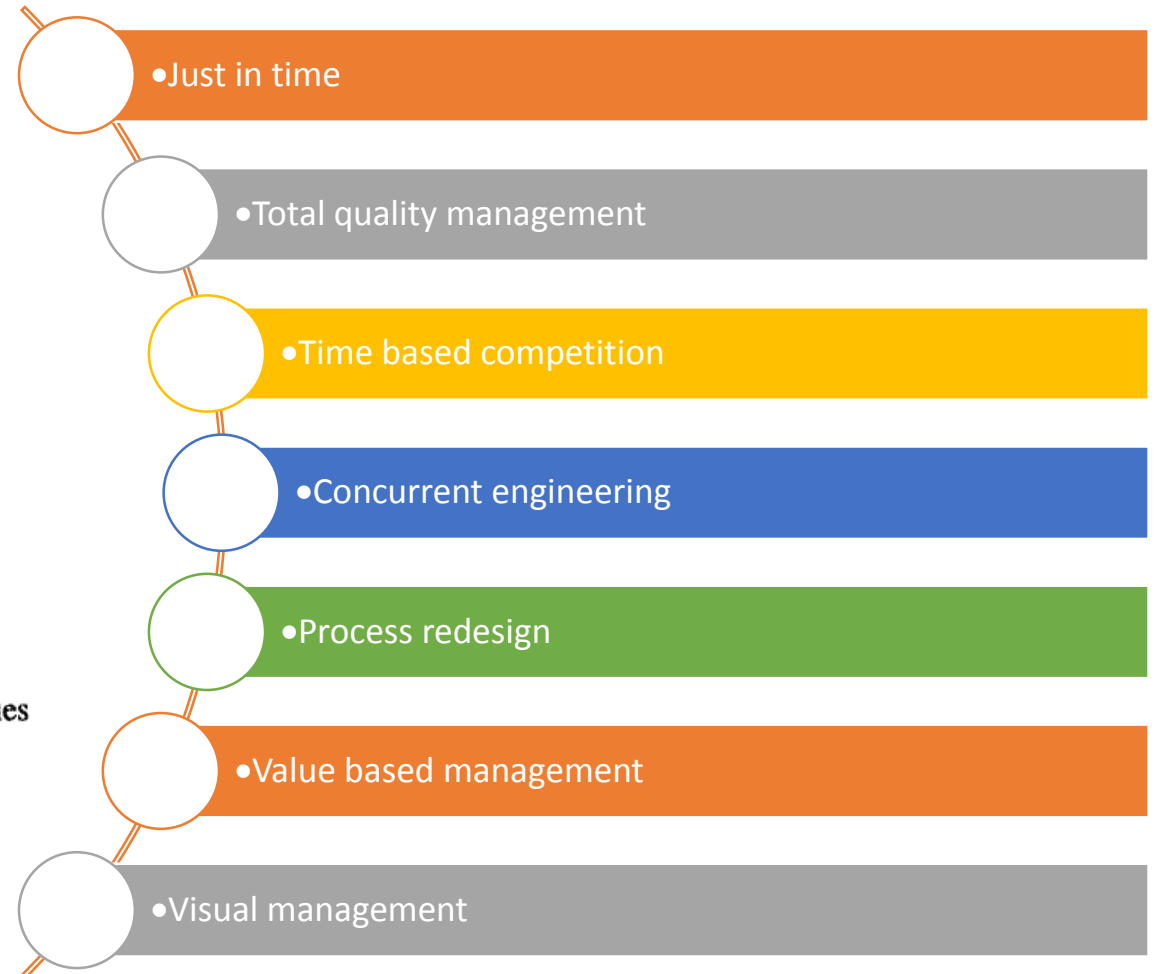
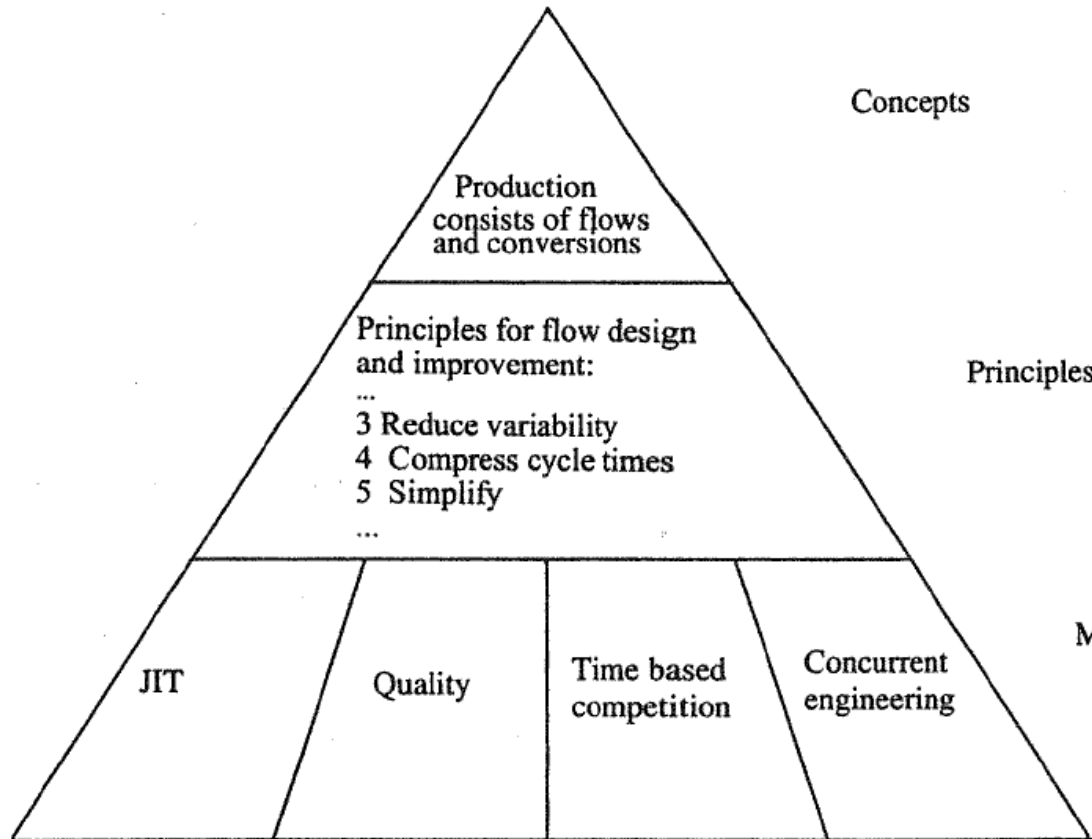
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# What is Lean?

LEAN TRANSFORMATION (TL) aims to make your company more competitive. The main objective is continuous improvement.

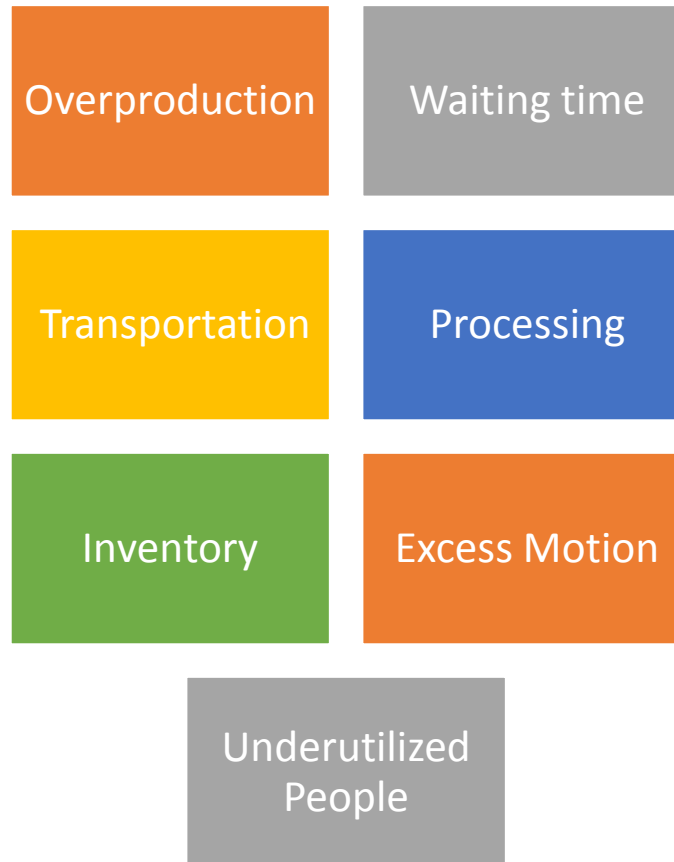
This philosophy is based that there are two aspects in all production systems: conversion and flows. While all activities expend cost and consume time, only conversion activities add value to the material or piece of information being transformed into a product.

# Lean Production





# Lean Principles



- *Elimination of waste*

The wastes noted above are commonly referred to as non-valued-added activities, and are known to Lean practitioners as the Eight Wastes. Taiichi Ohno (co-developer of the Toyota Production System) suggests that these account for up to 95% of all costs in non-Lean manufacturing environments.

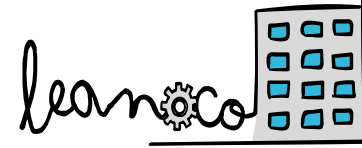
# Lean Principles



- *Definition of Value*

The value of the product according to the Lean Thinking is specified in accordance with the criteria of the client, adapted to their needs and manufactured by the producer.

The value stream consists of all required specific activities, allowing for leading a given product through three areas of management: design, management of information and transformation



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## Lean Principles

- *Constant process flow.*
- *The "Pull" principle. It is aimed at control of production processes, focused on the necessary and real consumption of materials in the place of assembly.*
- *Constant improvement( Kaizen). The Japanese "Kaizen" means improvement, continuous improvement involving everyone in the organization from top management, to managers then to supervisors, and to workers*
- *Cooperation.*