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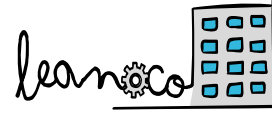
**Warsaw University  
of Technology**

# LEAN CONSTRUCTION



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# 3. Lean Enterprise



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## Idea:

The lean management philosophy, after some modifications, can be applied to the construction industry under the term “lean construction. Translation of the “lean” concept to construction depends on modification of the methods which were devised for regular, fixed-basis industries as needed due to the specific nature of construction, thus:

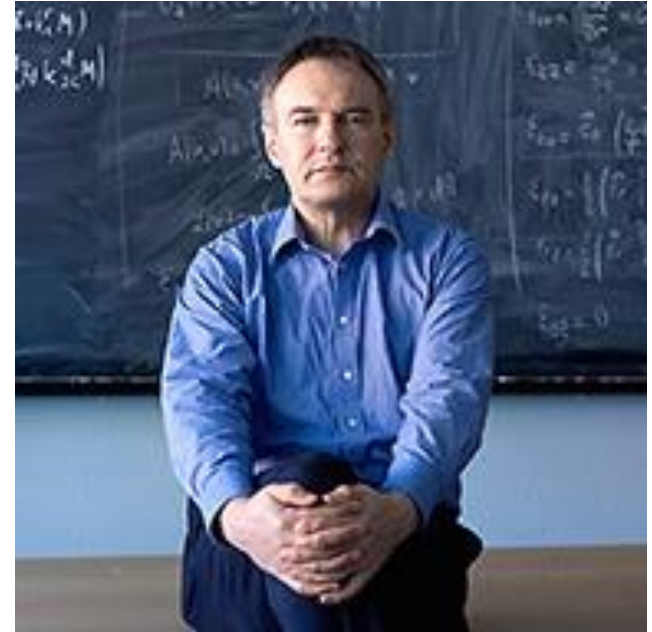
Limiting waste

Structuring the  
product value  
generation  
processes

Partnership-  
based  
cooperation

In the context of lean construction, it is necessary to mention Laurie Koskela, who, in the early nineties, dealt with application of lean management in construction. He stated that it was necessary to complement the transformation aspect (input-output relations) of the construction manufacturing process by adding the component of flow of activities, resources and information, as well as understanding of value.

**Laurie Koskela**

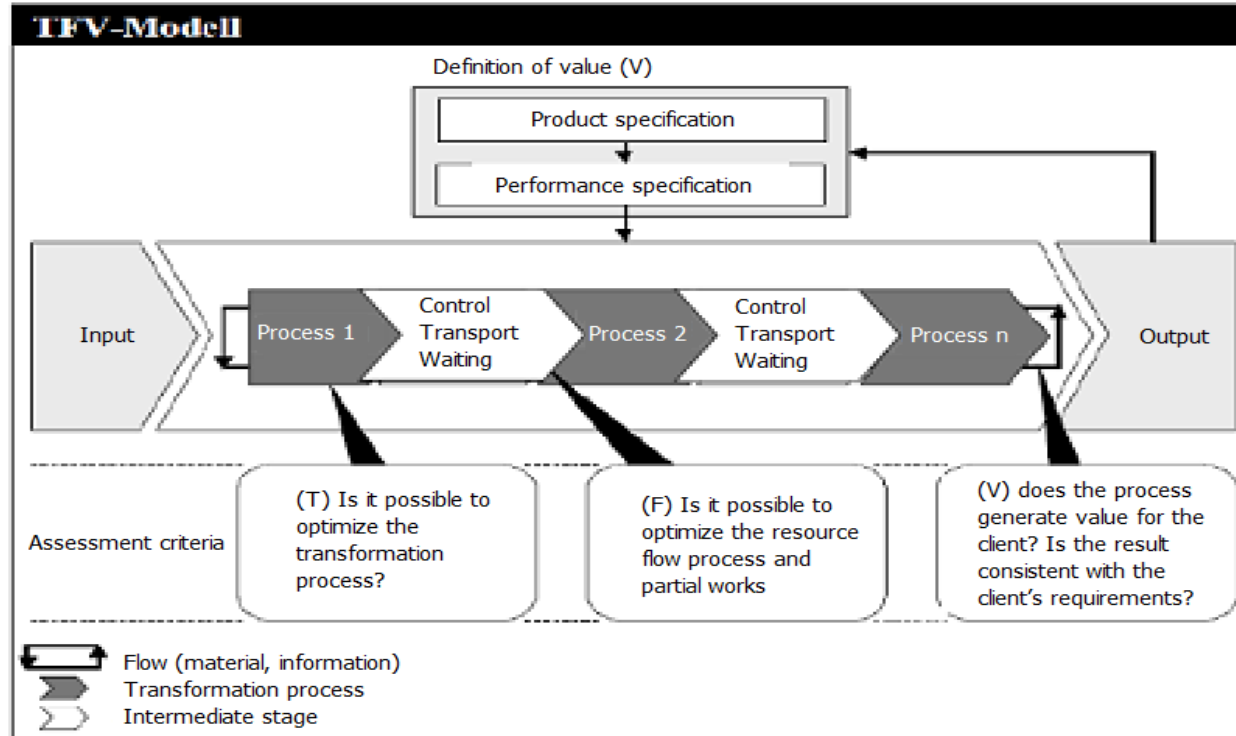


source: <http://visilean.com/about/>

# TFV Model



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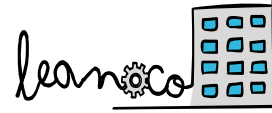


When lean construction is applied, the core element should always be the **employee**. Work time organisation is a significant component of occupational health and safety. Limitation of the scope of work, organisation of work division (e.g. during the day) and the associated difficulties at work are only selected components of the processes of organisation of construction works.

Rationalisation methods in work processes must be introduced taking into account the work organisation, which has been materially and professionally justified.

From the perspective of construction, in the organisation of work duration it is necessary to take into account the binding provisions of the act on collective work agreements.

Therefore, according to the legal provisions in force in Germany [*Tarifrecht*], the work time indicator tables, approved by parties to the collective work agreement serve as a basis for the corporate division of production processes (the area of piece wages). These were prepared in accordance with the labour science methodology and they are representative of processes on ordinary construction sites.



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**The work time indicators for general construction industry (ARH tables) provide for:**

10% - time for rest

20% - additional time (unplanned waiting time, additional tasks, personal breaks e.g. toilet)

70% - basic time (main task + auxiliary task + planned waiting time)

## In the case of a boarding work team, the main tasks include:

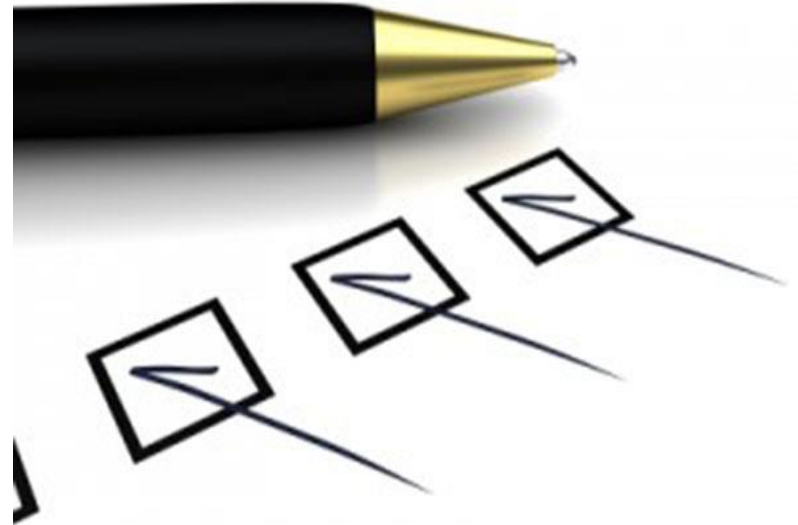
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- Four large, downward-pointing chevrons are arranged vertically on the left side of the slide. They are colored red, orange, yellow, and green from top to bottom, respectively. Each chevron is partially overlapped by a white rectangular box containing a task.
- Transport of wall formwork within the construction site
  - Placement of formwork and assembly of joints
  - Placement of supports, evening out of formwork
  - Assembly of work scaffolding



## Auxiliary tasks include:

Cleaning

Putting in order



Main and auxiliary tasks serve the implementation of the work task directly or indirectly. In construction, these are the activities that generate the value of the product (e.g. the construction facility).

These include the logistics, carried out according to the plan (e.g. transport of formwork). It is always the necessary component of the production process, since the construction facility (or its part) usually meets the conditions of the agreement only within the framework of specific spatial coordinates (value generation), regardless of the principle of performance of works.

Time for rest is necessary and obligatory. Construction works belong to the category of hard physical work. They are characterised by multiple load, such as carrying of heavy weights, exposure to cold and unfavourable weather conditions, piecework system, exposure to dust and noise, as well as emission of other substances.

## Physical load of work and requirements to be met by men at work:

