

## Abstract

Most government infrastructure projects get delayed resulting in increased budget and public inconvenience. The internal team often lacks motivation and the external team of contractors gets demotivated due to continuous delayed decisions, losing their planned margins. While Lean Tools (VSM, Last Planner, Gemba Walk..) can help in accelerating the progress of the projects, **developing a collaborative work-culture** within the project team is challenging, making many lean tools ineffective. The present case is a **SUCCESS STORY** under this scenario.

## Introduction

This Case-study is about a project of 2.5 km. long bridge over river Mahanadi in Odisha, India, initially delayed by 3 months, but finally accelerated its progress and completed 8 months remaining work in 5 months

## Need For Study

- Govt. Infrastructure projects are delayed significantly, causing loss of public money and furor. Works Department, Government of Odisha (OWD) wanted to pilot, if Lean Concepts can change this perception.
- How to build collaboration among the internal government team-members and external Contractors team-members.

## Objectives

- To accelerate the project progress rate by 60-70% within same budget.
- To enhance Project's collaborative working culture through motivating client's & contractors' team-members.
- To demonstrate the utility of Lean Tools like *Hunting Wastes* to eliminate wastes, *Value Stream Mapping (VSM)*, *Single Minute Exchange of Dies (SMED)*, *The Last Planner*.

## Methods

OWD emphasized for capacity building of few of its key senior executives in Lean concepts like VSM, Waste elimination and Last Planner and engaged an external Lean Trainer-cum-Mentor.

The chosen crucial incomplete project as pilot, was already delayed by 50 days till October, 2017. The scheduled date for completion was April, 2018 but the delay was found to result in completion by June end. A new strategy was thought to motivate the internal team leveraging human emotions. With brain-storming a very important emotional event was discovered which was leveraged to bring acceleration to remaining part of the project work. The organization head, the PWD Secretary, was retiring on 31<sup>st</sup> March, and the team decided to honour him by inaugurating the biggest Bridge as his retirement gift, which would be memorable to him for his life time. The champion team would get the visibility in the department, for a never-done-before type work. But this meant project was to be completed by 31<sup>st</sup> March, reduction of another 35 days. Overall, this meant **200 days of remaining work is to be completed in 115 days**. The bridge project involved huge and costly equipments and machinery, like Girder Launcher (76 Tons; 35 meter long), along with risky and difficult activities over the river.

But, internal team got charged-up 'emotionally' to complete 200 days of remaining work in 115. External Team (Main Contractor) was also motivated as his 'profit enhanced' by 20%, saving on delay penalty cost and earning early completion bonus.

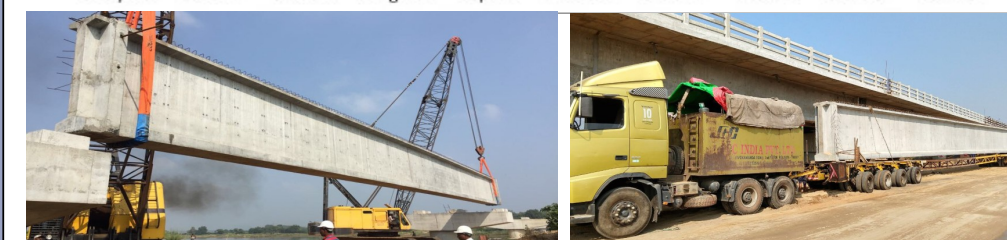


Figure No. 1

## Results

- Balance 200 days of work of project was completed in 115, with 74% faster completion time using Lean Digital Thinking™
- The Secretary was extremely happy to see almost impossible outcome.
- The contractor was quite happy to add about 20% to his planned profit, by being eligible for early completion bonus, besides avoiding paying penalty for delayed project.
- VSM & SMED helped Girder launching process to reduce the cycle time/ span, from 10 to finally 5 days/ span (Fig 2).
- To further accelerate, 64 girders, (76 T each) were mounted on the other dry-end of the bridge using Cranes. Transportation of girders to other end (45 km by road) was another major challenge which was jointly resolved by internal & external teams & reduced safe transportation time by 50%.
- After Girder Launching process, Slab casting was the next bottleneck. That cycle time was also reduced by VSM and SMED tools, and execution was monitored by simplified version of Last Planner

Girder Launching Time( # days/ Span)



## Discussions

Weekly monitoring by Mentor of 'two words' reporting: 'on-schedule', 'ahead of schedule'. And 'behind schedule', & one-line action plan and/or 'ask from seniors' to make-up any slippage was very effective. No big reports or daily production reports were insisted.

## Conclusions

- This bridge was formally inaugurated by the Chief Minister of Odisha on 1<sup>st</sup> of April 2018, the Odisha Day. (fig 8), although it was originally planned to be over by 30<sup>th</sup> June 2018.
- This project proved the point that even Government Infrastructure projects can be accelerated using Lean Concepts.
- This also corroborated the thinking that an external Trainer-cum-mentor (and not Consultant!) is helpful to achieve the success. So the onus of success remains with the Client **and not** with the Trainer-Mentor. He is only enabler/ troubleshooter.
- There are several excellent tools of Lean Construction, which can very positively impact the Delivery Time, Budget and Quality of work. However the most important requirement is the *collaborative work-culture*, which is not easy to achieve. Senior Leadership Team's belief, patience & commitment to this is a must.

Figure No. 5,6 & 7



## References

1. Mckinsey Global Institute (2017), "Reinventing Construction: A route to higher Productivity", published by Mckinsey & Company, February 2017.
2. Dr. Subhash Rastogi (2015) "Elimination of Wastes in Construction: A Case Study", Indian Lean Construction Conference ILCC 2015, Proceedings Feb 5-6, Mumbai