# Implementation of Agile Construction to Achieve Fast and Efficient Construction.

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**Abstract**
*Construction projects are one-off strives with many distinctive features like a long period, abominable environment, complicated processes, financial intensity, and such technological and organizational complexity creates enormous risks which resulted in the form of delays in construction projects in completion and cost overrun. Where nearly two-thirds of the construction projects in the world have been suffered by significant problems as an increase in the cost of the project, delay in the specified duration for execution, and stopping the projects. The avoidance of failure in construction projects is not an easy task, which makes the failure of the construction project to achieve its objectives a major problem experienced by all countries in the world. Therefore it is required to study and apply new methods for managing the construction project to ensure its success and achieve its objectives. The aim of this study is to study the agile project management method and its impact on the construction projects. Agile project management can be applied to almost any large scale project in any industry, including construction. Agile asks you to first think of a project at a strategic level, then break it down into tasks.*
*Keyword: Agile, risk, delays, overruns*

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## I.    INTRODUCTION

Traditional projects are performed in a single continuous flow, with sequential steps that include project initiation, project planning, project execution, and project closeout. Typical construction projects have an initiation/planning phase, a design phase, a construction phase, a testing phase, and a turnover to the user phase, followed by project closeout. Traditional contracting methods and construction project management, such as firm fixed price, and purely sequential hand-offs between activities (design to construction, construction to testing, etc.) would not support either the schedule or the funding profiles. The project adopted many agile methodologies to complete construction safely, on time, and under budget, while meeting all milestones successfully.

Schedule delays are common on construction projects, which can negatively impact the overall project performance. This situation is partially due to the nature of design and construction processes, which contain dynamic interactions among diverse parameters, such as project attributes, participant experience, and time and cost constraints.

Within software development agile project management (APM) has been widely and successfully used; "Agile innovation methods have revolutionized information technologies.

## II.    OBJECTIVES
•       To study the agile management and identify the utilization of agile management in construction.
•       To study the cost-benefit analysis process through some construction projects
•       To establish the applicability of scrum meeting in construction project management.
•        To establish the applicability of scrum roles in construction project management

## III.    PROBLEM STATEMENT
'To analyses the causes of project delaying and minimize them and also use the resource in efficient and systematic manner. To avoid cost and time overrun and achieve speed and efficient construction by implementing agile construction method.'

## IV.    Methodology
To create a framework for agile construction management, a comprehensive review of existing literature is employed as the primary approach. The literature review covered the area of agile construction management.

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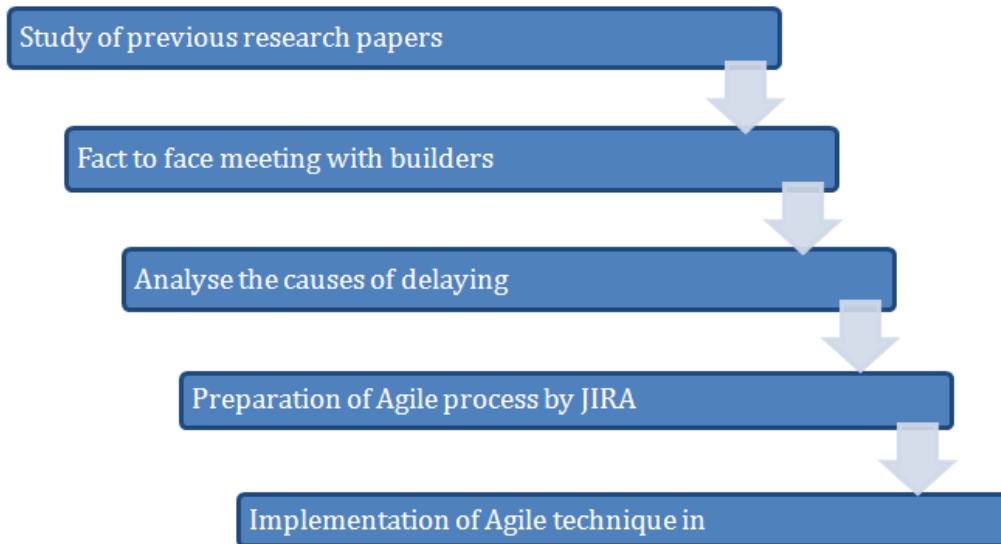
## V.    LITURATURE SURVEY/BACKGROUND

A traditional concept of management, the responsibilities and authorities are defined in a hierarchy so if a middle level chain is broken than the ground level subjects are failed. In agile concept, the basic belief is to keep all responsibilities & authorities on the same level such that even if there is a failure in single subject, the remaining subject can work efficiently in their sectors. Agile project management has its foundations in the management science of .But perhaps harks back to pre-industrial revolution times, before decomposition and Management-as-planning took a hold. The real progress today lies in the domain information systems; however, it may be possible to migrate the core attributes to other domains, including construction.

Literature survey aimed to identify the effective utilization of agile management in construction industry. The report "Is agile project management applicable to construction" was written by lauri koskela, university of Sanford (2006), briefly summaries the evolution of Agile Project Management (APM) and differentiates it from lean and agile production and 'leagile' construction. The significant benefits being realized through employment of APM within the Information systems industry are stated.

Literature survey on "Application of Agile Project Management to Reduce the Time Overrun in the Construction of Infrastructure Project" was written by Divakar.K and Ashitha. E.V.R in 05 | May -2016.
Agile Project Management (APM) is an interactive and incremental method of management which is applicable for highly flexible environment. Agile methodology has been found to improve the reliability of project delivery by decomposing the project into smaller manageable parts and completing these parts with greater delivery value.

## VI.    PROPOSED WORK/SYSTEM

Literature study, questionnaire survey and case study analysis methods are followed for this thesis
●      To study the traditional project management and agile project management principles related to Construction industry.
●      To learn the JIRA software for agile management in construction.
●      To study the effect of agile management in construction industry.
●      Avoiding inflexible processes that can't be changed.
●      Using short iterative processes allowing for improvements to be quickly implemented or failures to be identified before the end product.
●      Emphasizing learning and continuous improvement.

**Scrum** is an agile development methodology used in the development of Software based on an iterative and incremental processes. Scrum is adaptable, fast, flexible and effective agile framework that is designed to deliver value to the customer throughout the development of the project. The primary objective of Scrum is to satisfy the customer's need through an environment of transparency in communication, collective responsibility and continuous progress.
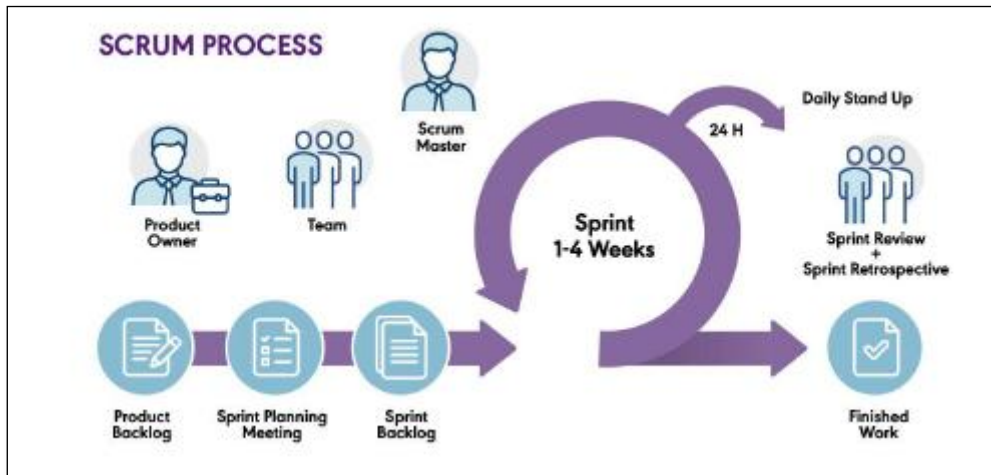
Fig1: Scrum Process

Scrum is executed in temporary blocks that are short and periodic, called Sprints, which usually range from 2 to 4 weeks, which is the term for feedback and reflection. Each Sprint is an entity in itself, that is, it provides a complete result, a variation of the final product that must be able to be delivered to the client with the least possible effort when requested.

The process has as a starting point, a list of objectives/ requirements that make up the project plan. It is the client of the project that prioritizes these objectives considering a balance of the value and the cost thereof, which is how the iterations and consequent deliveries are determined.

The best Jira Scrum workflow will enable you to smoothly move through the Scrum process are followed.

**The Sprint**
In Scrum, everything rely on Sprint. This is a fixed and agreed calendar window with its own agreed goals and targets.

**The sprint planning meeting**
This event kicks off the Sprint. The full team gathers to discuss on the Sprint goal and to assess the specific tasks to be accomplished.

**Daily Stand-up meetings**
This is a daily meeting for the full team to identify completed activities, upcoming task, and forthcoming problems.

**Sprint Review**
The team reviews what tasks have and haven't been completed, presents this work to stakeholders, and establishes what to tackle next. For developers, this might mean demonstrating software that has been tested and documented and is ready for release.
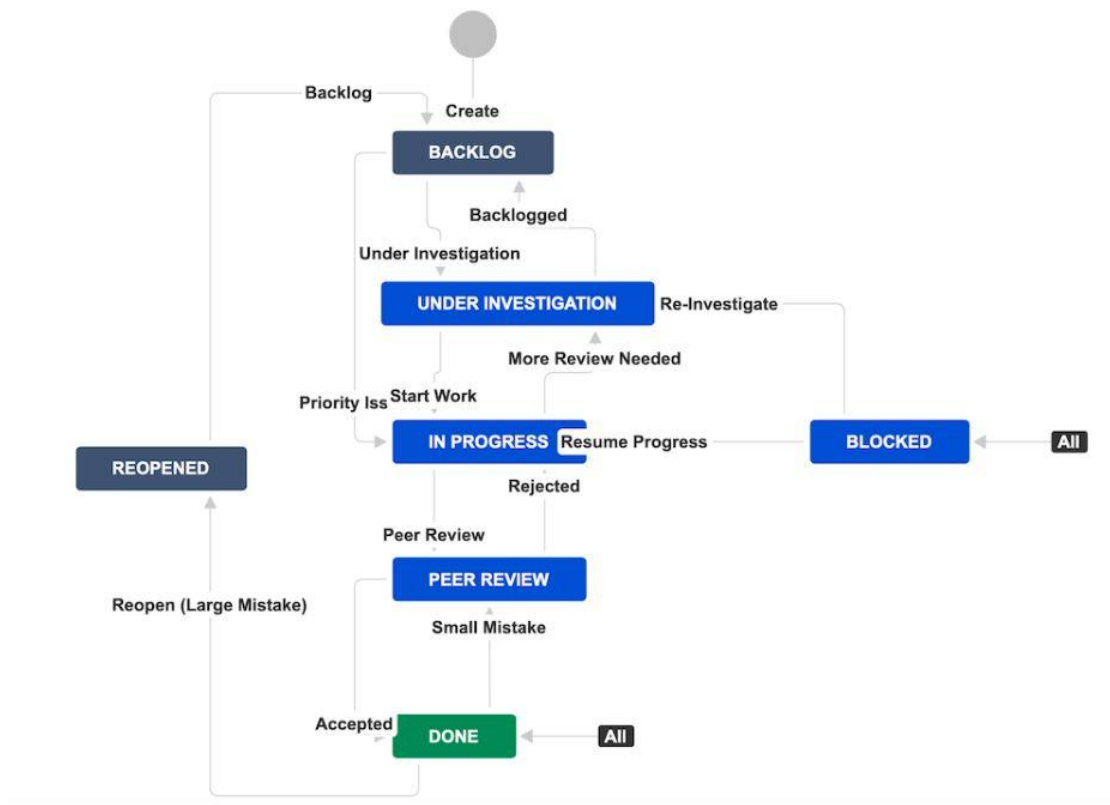
Fig no scrum flow

**Sprint Retrospective**
Following the Review, the team gathers to reflect on the Sprint and to identify lessons and opportunities for process improvement.

**Backlog grooming**
This is an ongoing process of ensuring that the backlog is prioritized correctly. This is constantly reviewed by the product owner and is presented to the team during the Sprint planning meeting.
The optimum Jira Scrum workflow will make it easy to resolve issues through the Sprint.

**Calculation of materials required**

| Name of Project: | | | ABC Ganga | | | | Building Nam |
|---|---|---|---|---|---|---|---|
| Name of Client: | | | ABC Builders and developers | | | | Name of cont |
| Name of Architect: | | | ABC Architect | | | | Sheet Name |
| Name of RCC Consultant: | | | ABC Structure consultant | | | | Sheet Prepare |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Sr No | Location | Description | l (mm) | B (mm) | D (mm) | Formwork(sq.m) | concrete (cu.m) |
| | | | | | | | |
| 1 | C1,C13,C17 | F1 | | | | | |
| | PCC | | 1475 | 1250 | 100 | 0.545 | 0.184 |
| | Footing | Main Bar | 1275 | 1050 | 350 | 1.628 | 0.469 |
| | | | | | | | |
| | | Dist. Bar | 1275 | 1050 | 350 | | |
| | | | | | | | |

**Quantity of fine aggregate, coarse aggregate and cement for slab.**

Area = 500 sqft
Thickness = 5 inches
Feet to meter
500      ft= 500/10.76 =46.5
5 inches =5x25.42=125mm=0.125m
Volume of slab = 46.5x0.125 =5.905
For M20 mix proportion 1:1.5:3
As per IS 456:2000 mix design quantity of material required.
Cement =400 kg/m^3
Sand = 600 kg/m^3
Coarse aggregate = 1200 kg/m^3
Cement required for slab = 5.905x400 =2362 kg
Cement bags = 2362/50 =48 bags
Sand required = 5.905x600 =3543kg
Coarse aggregate required = 5.905x1200 = 7086kg

## JIRA

Jira Software is part of a family of products designed to help teams of all types manage work. Originally, Jira was designed as a bug and issue tracker. But today, Jira has evolved into a powerful work management tool for all kinds of use cases, from requirements and test case.
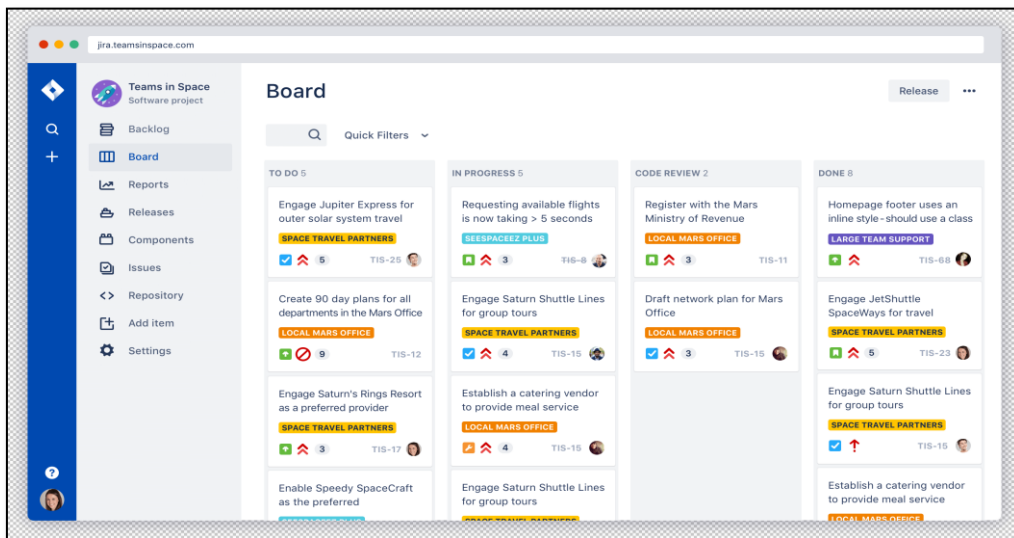


"Jira embraces the real agile philosophy by giving you a simple platform that is also highly customizable so that you can implement the process and elements that work best for your case/project and with a rich out-of-the-box feature set that represents elements of multiple agile project management techniques."

The first step is to head for the Jira workflow designer, which allows you to edit the workflow layout and how statuses and transitions fit together.

**Status** such as "In Progress" or "Under Review".
**Transitions** the lines connecting Status items.
**Resolution** how issues are ultimately resolved.
 **Conditions** limiting which roles can progress issues to the next stage.

## VII.     RESULT AND DISCUSSIONS

It is important to verify that agile processes do actually lead to worthwhile improvements, compared with traditional processes. In order to examine why agile project management offers such an advantage, it is
Necessary to examine the core aspects of its nature.
● 	 Agile results in deliver reliable results by engaging customers in frequent interactions and shared ownership.
● 	 Agile results in expect uncertainty and manage for it through iterations, anticipation, and adaptation.

● Agile results in unleash creativity and innovation by recognizing that individuals are the ultimate source of value, an   environment where they can make a difference.

● Agile results in boost performance through group accountability for results and shared responsibility for team effectiveness.

● Agile results in improve effectiveness and reliability through situationally specific strategies, processes and practices.

## VIII. CONCLUSION

Agile project management is the advanced type of method used for construction project management instead of the traditional waterfall method. APM is said to reduce the delay for about 60% to 80% as per various literatures in software industry and this framework can help to achieve the same in the construction. It can be reduce the construction delay and uncertainty in the construction projects and also give better customer satisfaction.

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