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Current State Mapping of the Supply Chain in Engineering Procurement Construction (EPC) Project: A Case Study

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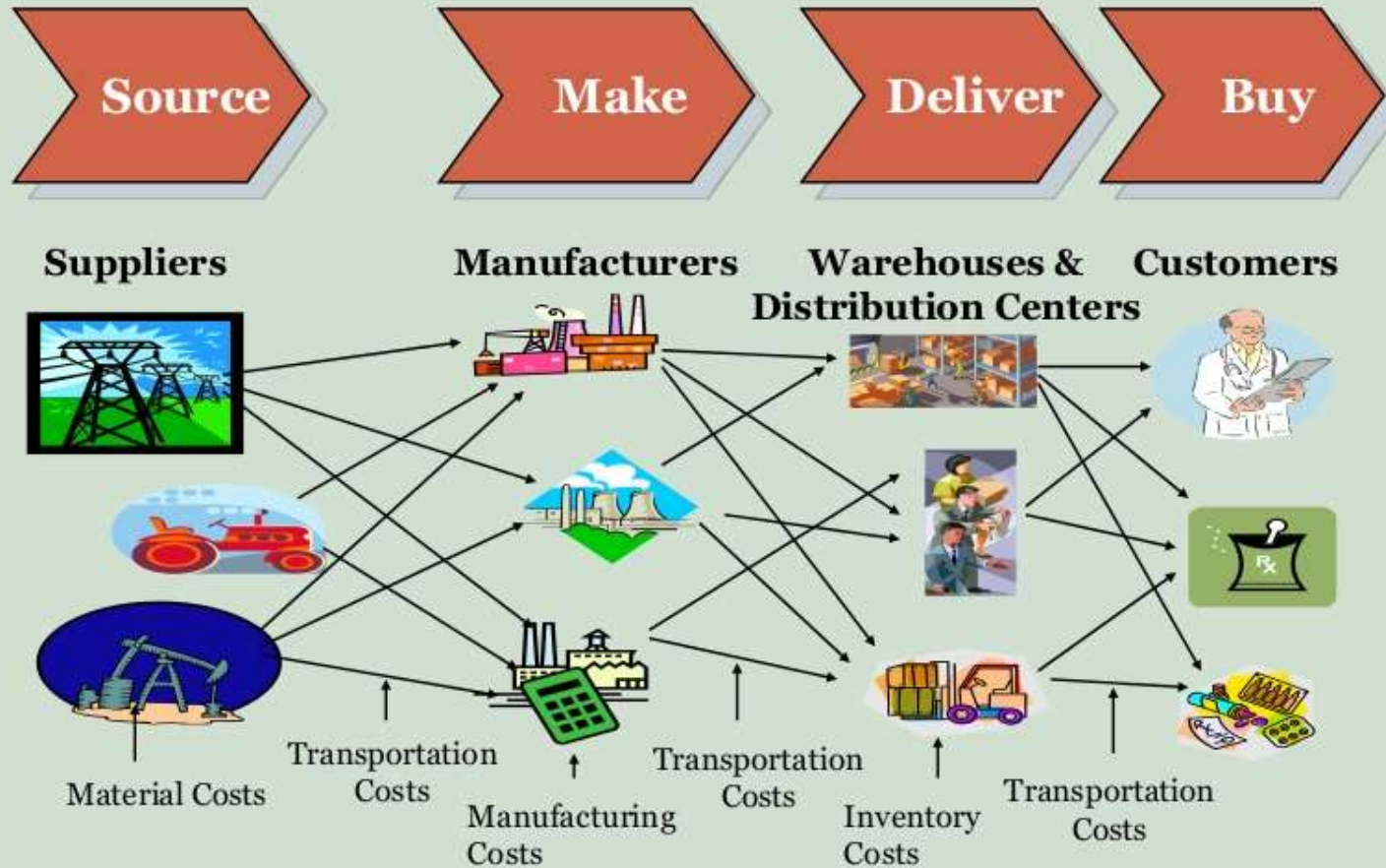
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Introduction

- For a long period of time, the poor performance and poor efficiency in construction projects have been confusing the researchers and stakeholders.
- Supply Chain Management (SCM) that has been successfully applied in manufacturing is introduced to construction projects to improve efficiency and reduce waste.
- Therefore, the construction project competition among companies has been changed into the competition among supply chains



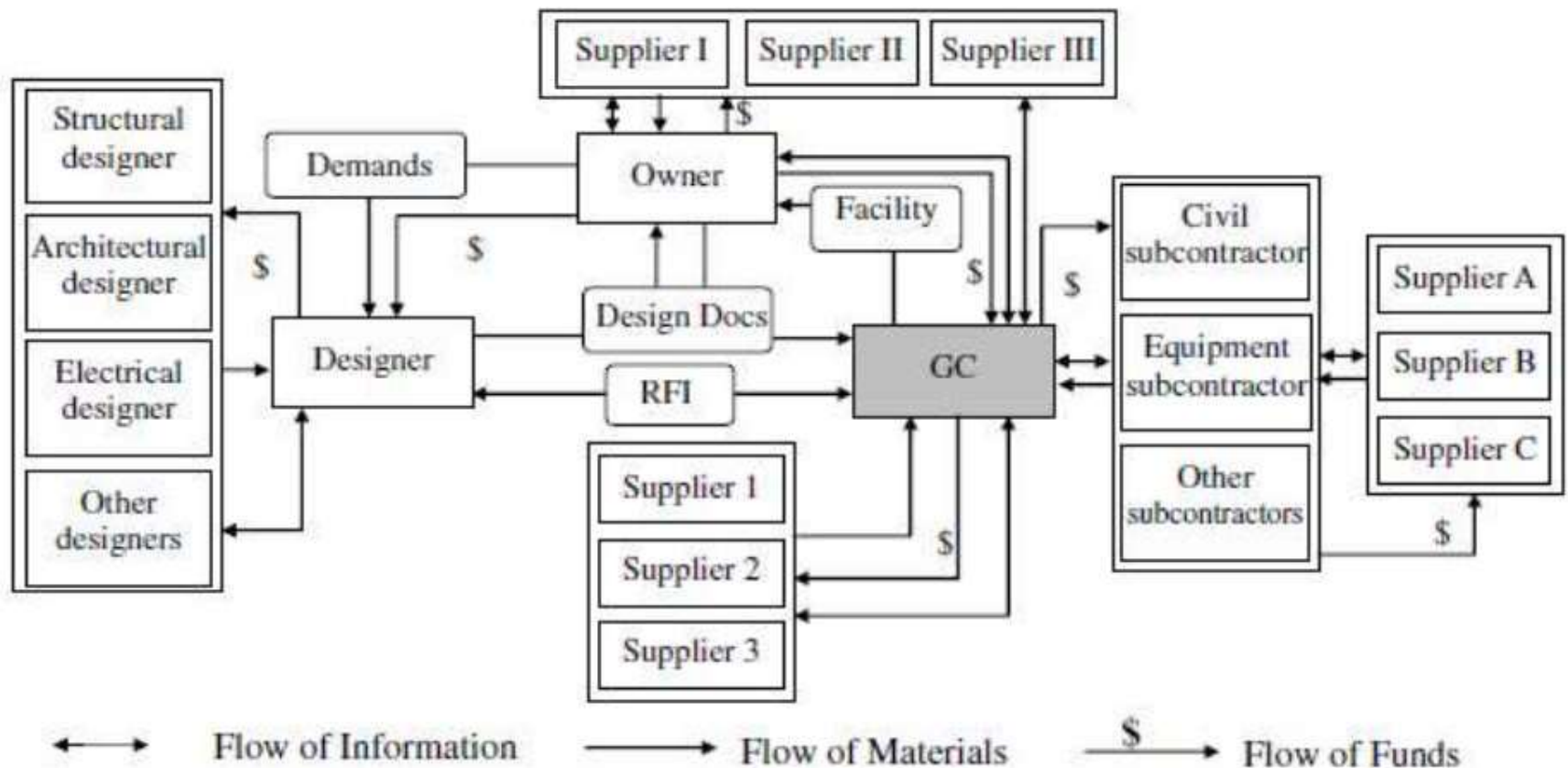
The Supply Chain View



Supply chain management is a means for dealing with these processes in a structured manner.

General structure of construction supply chain (CSC)

CSC includes the flow of information, materials, services or products, and the flow of funds between client, designer, contractor and supplier



Introduction

- One of the biggest project in Indonesia is Engineering Procurement (EPC) project at Banyu Urip, East Java.
- In the EPC projects, general contractors including designer, material procurement, construction, and operators.
- General contractors faced bigger risks than conventional projects, so SCM becomes an important aspect for the general contractor.
- This is because EPC projects characteristically have long processes, large scales, and multi-supplier. So, how the general contractor can maintain supply chain performance.
- Thus, there is a need for research to explore the current state mapping of EPC projects.



The Objective of Study

- The problem that usually occurs at EPC project is a type of material that is unique and large as the pipe of oil refining.
- For example, the EPC project of this case study used imported material.
- The contractor should plan where to buy it, when to bring in, and how good process of delivery is because they are the key success of the supply chain.

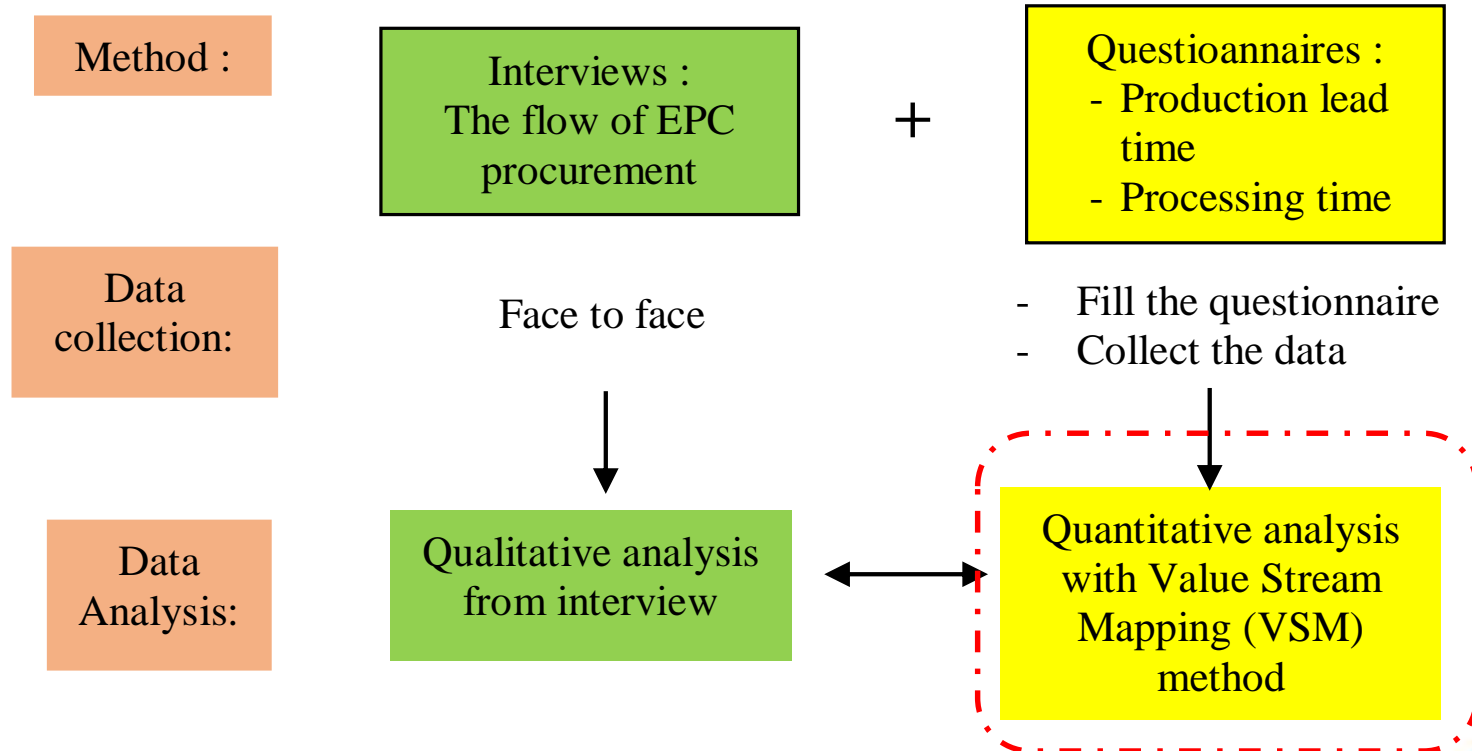
THE OBJECTIVE: To map the supply chain Engineering Procurement Construction (EPC) project

- Use Value Stream Mapping (VSM) method to explain the procurement processes for easier understanding and problem identification.

- It will illustrated in the procurement process behavior within a specific period from the total production time.



Methodology



Case study: the procurement of pipe material



Results & Discussions

- Banyu Urip project consisted of 5 major contractual divisions of work to Engineer, Procure and Construct (EPC) the facilities needed to produce the field.
- These divisions were called EPC-1 through EPC-5 → This study focused on EPC-1.



EPC-1:
Central Processing Facility



EPC-2:
Onshore Pipeline



EPC-3
Offshore Pipeline, Mooring
Tower and Support Structure



EPC-4
Gagak Rimang floating storage and
offloading vessel



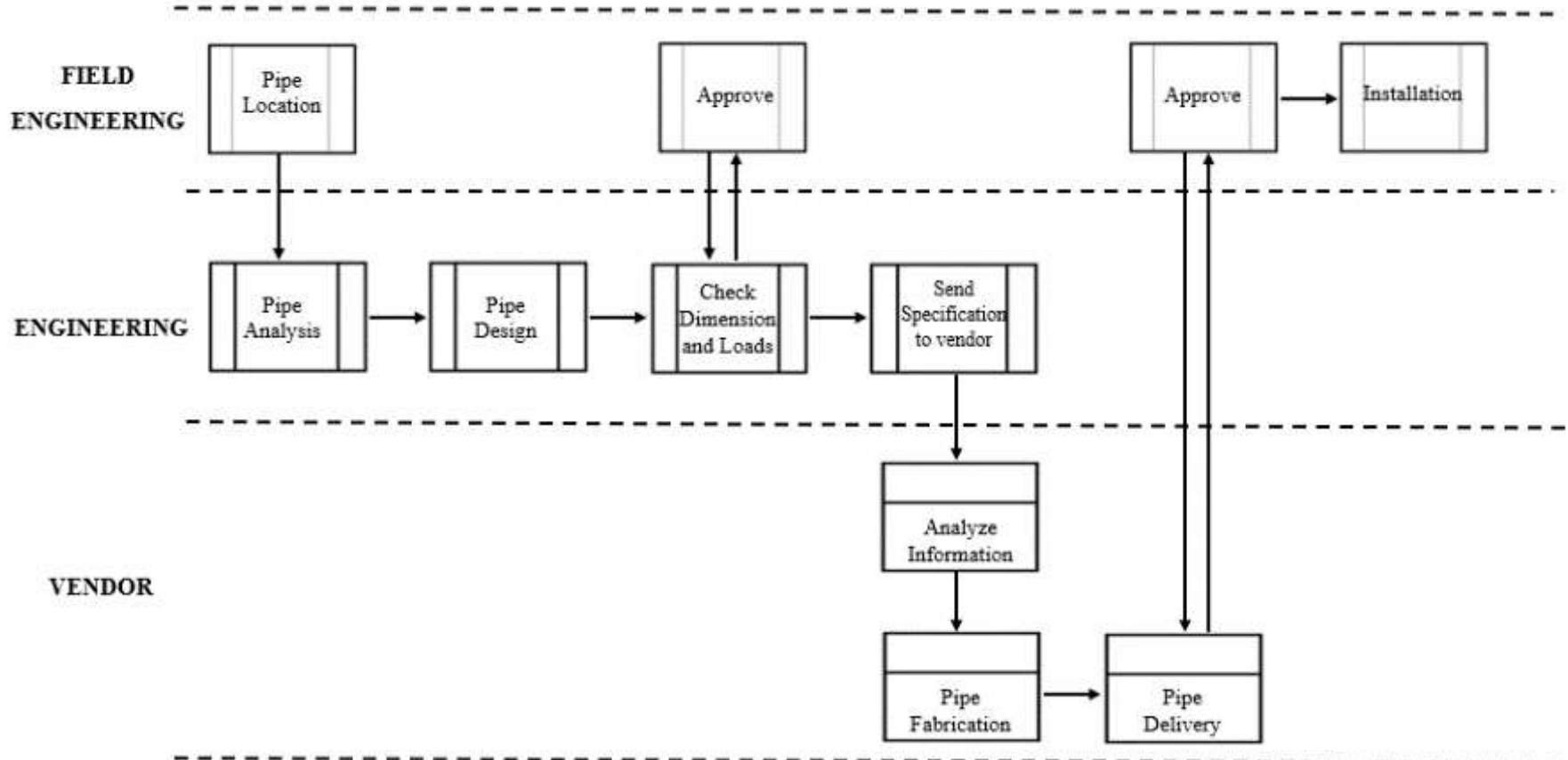
EPC-5
Infrastructure, Raw Water Basin and
Flyover Road

Results & Discussions

- The EPC-1 contract was awarded to Indonesian-led consortium Tripatra-Samsung, whose scope included the Central Processing Facility (CPF), which was built logistically central to Well pads A, B and C, where 45 wells were drilled to produce the crude oil and inject water and gas.
- Natural gas, produced along with the crude oil, is used for power generation at the CPF.
- This is gathered with flow lines and processed by the separation equipment to remove gas and water components from the crude before its delivery through the pipeline for storage and sale.
- At peak construction, over 17,000 people worked on Banyu Urip EPC-1 project simultaneously.

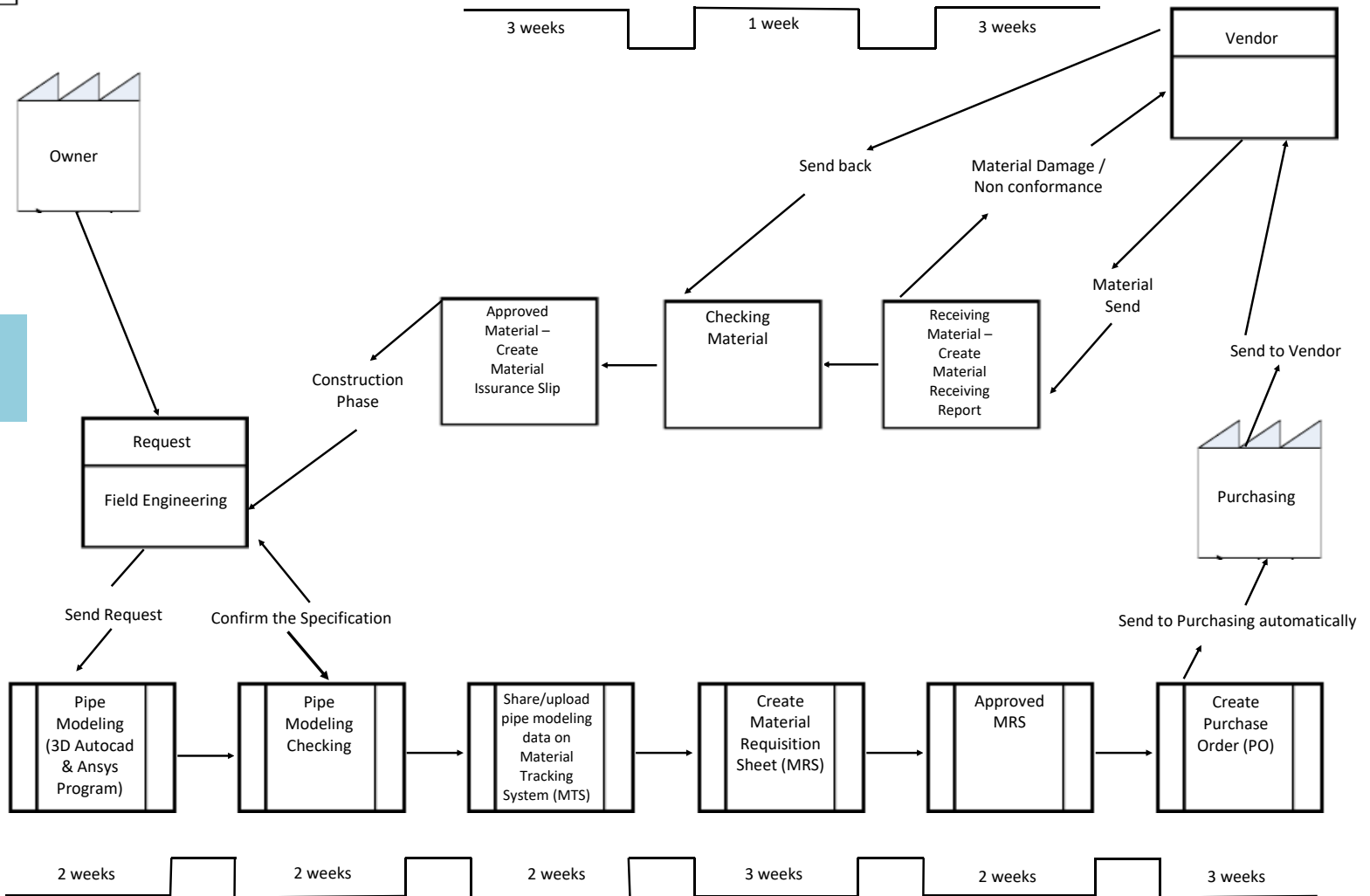
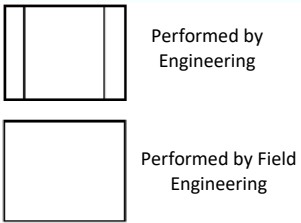


Results & Discussions



Supply chain of pipe supports in EPC Project





Total time: 21 weeks

Current state value stream mapping of pipe material

Discussions

- The procurement of pipe that needs 21 weeks to flow through the phase completely is too long.
- The contractor should be able to accelerate the time again.

Use local vendors during the EPC project in the case study often takes the overseas vendor, especially the pipes material. It is rather difficult but with a good cooperation of local vendors and good quality of materials, this concept can reduce the duration of procurement of pipes material.

Involving suppliers early in the design and develop supplier alliance. With the large scale of the project and all is designed by contractor, it is necessary to involve other parties in the design phase. Suppliers will direct understanding of the project requirements early and be able to manage their own supply chain better.

Improve communication and coordination between supply chain participants. Effective communication between different departments in-house is a common difficulty for engineering firms. Industry practitioners explained that 15% of engineering designs have some mistakes.



Conclusions

- This paper has illustrated some of the complexities presented in construction supply chain by presenting the case of pipe supports used in EPC project.
- It also has demonstrated the current state mapping that is very valuable to improve the supply chain performance in EPC projects.
- Based on a case study on pipe material, the procurement process from upstream to downstream takes 21 weeks. This is a waste of time to look for solutions.
- There are some views of supply chain improvement that need to be applied and certainly still need a lot of studies. Such views are (1) using the local vendors, (2) involving suppliers early and providing input into engineering design, and (3) making good communication between supply chain participants.



Thank You

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