

Client Background

- Descon Engineering is a leading engineering company based in **Lahore, Pakistan** with projects and operations primarily in the Middle East and South Asia.
- Operate chemical and power plants, provide O&M for power plants in Pakistan, and provide expertise in areas such as hydro power, fertilizer, sugar, and cement.
- Descon Engineering has a team of over 10,000 professionals and has completed projects in more than 20 countries.

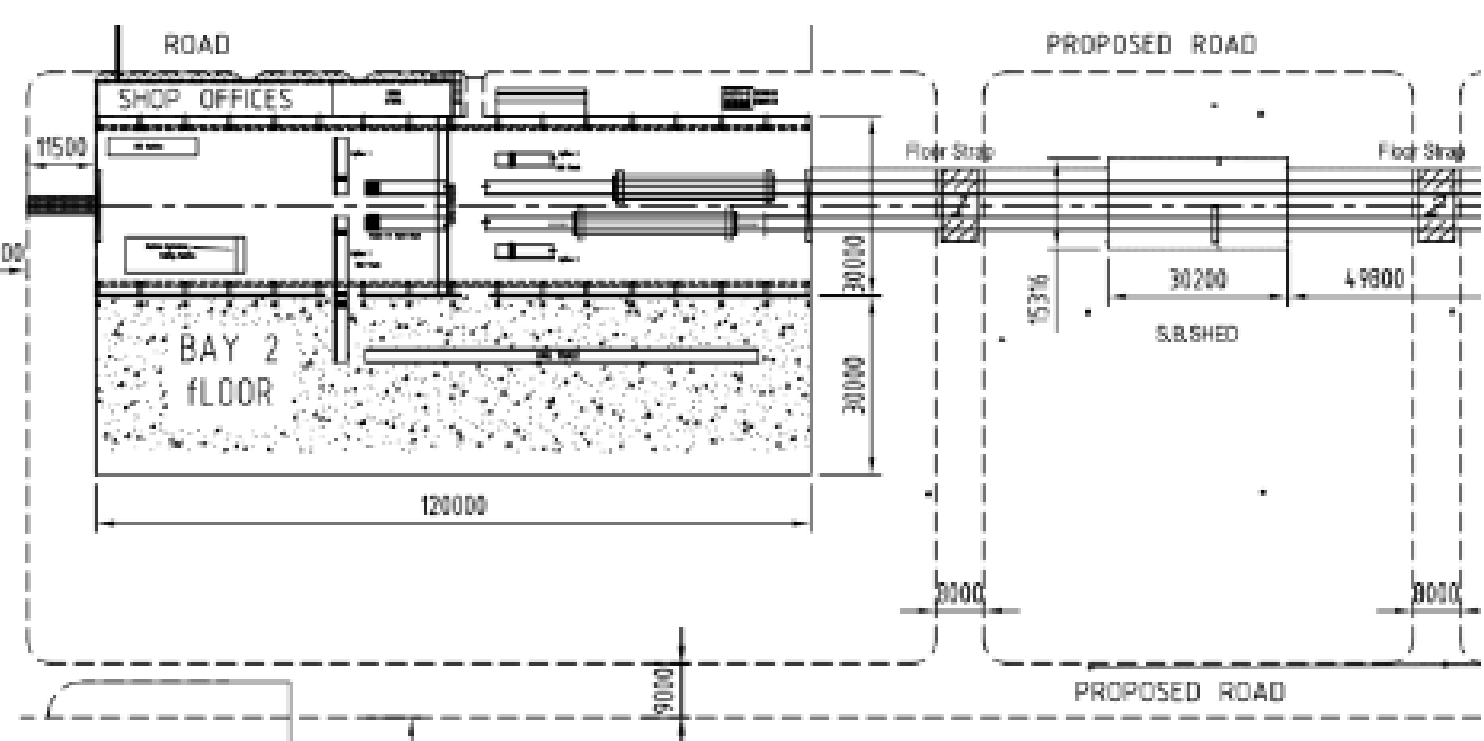
Problem Statement

The company plans to move their main operating Lahore facility to Karachi, a facility that has been sitting unused by the port, about 1,000 km away from their main facility. By researching available transportation methods and analyzing the obstacles in this facility transition, the company can better understand how to efficiently transition and layout their new facility in a manner that will allow them to operate and manufacture their products without major impacts on their current workflow.

System Model

Facility Layout

With the nature of Descon's project-based production, there is high variability in process types and flow. The goal for the new facility layout is to maintain production expectations of 8-14 tons per day.



The layout design is based around keeping frequently combined machinery as there is no uniform flow.

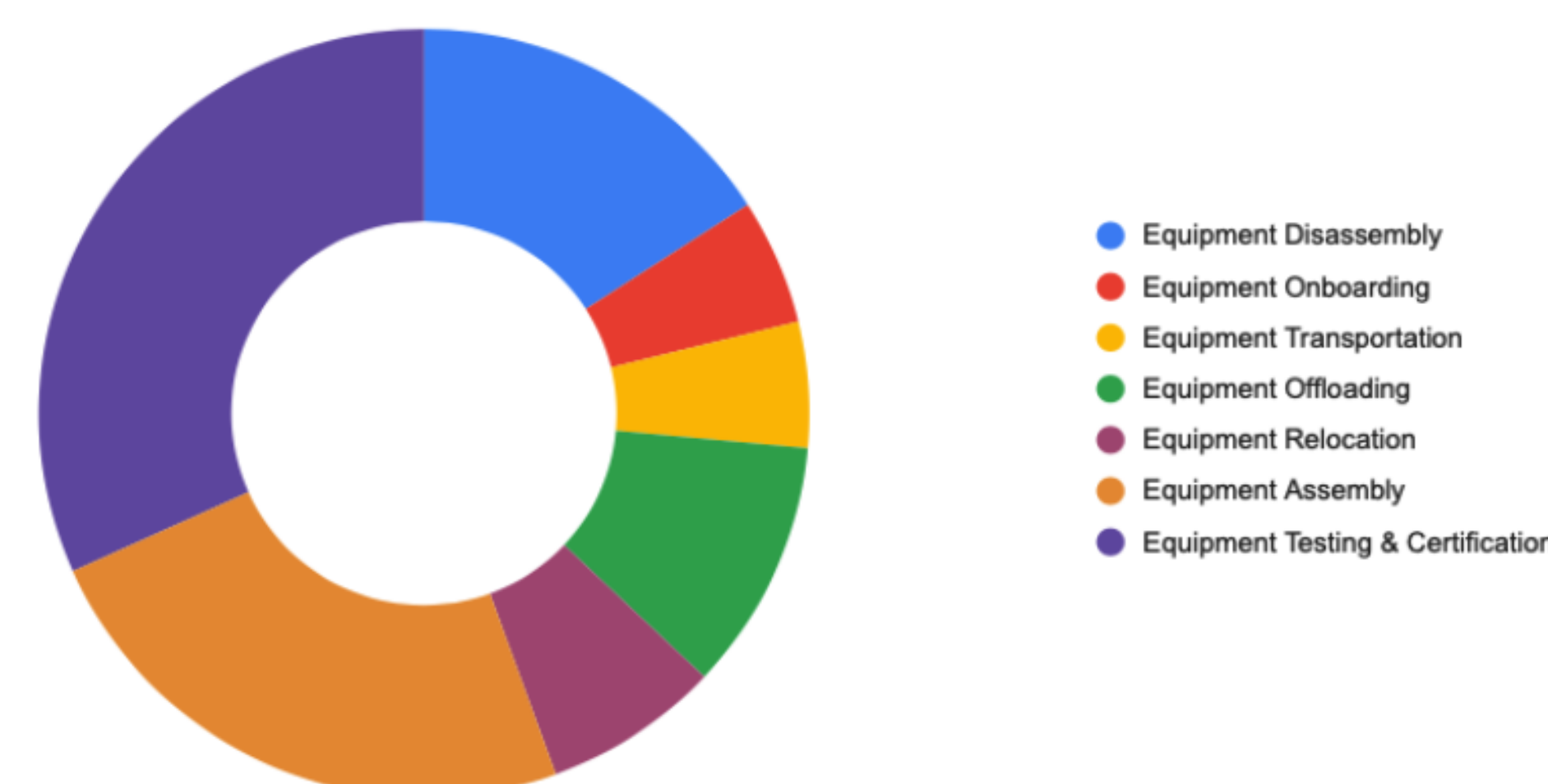
Acknowledgements

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- Aaron Ramsey
- Brandon Pitts
- Hassan Bokhari
- Haider Ali
- Vijayakumar Niranjana

Results

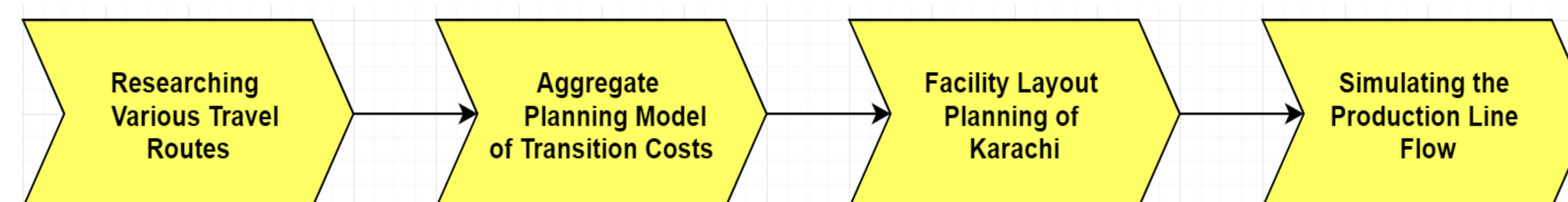
Total Time Distribution



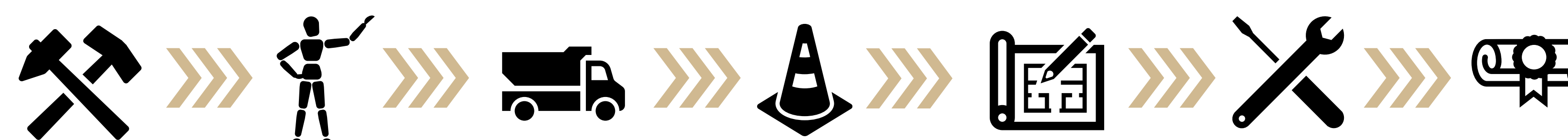
The most feasible solution for transportation of equipment and resources is utilizing the same trucking route and method that is used to ship finished product to Karachi currently.

The transition period is designed to be taken in steps, gaining functionality in the new facility while keeping some functionality in the former facility. The equipment will be transferred in order of active project needs.

Methodology



Aggregate Planning Model Flow



Discussion

Simulation

The team's simulation strategy demonstrates the equipment relocation process from Lahore to Karachi using the advanced Arena simulator. Optimal loading and unloading are achieved with a conveyor belt system, forklifts, and queuing models. Three methods are considered for the simulation:

- **Sequential Transition:**
 - Focus on minimal disruption
 - Limitations in productivity and costs
- **Parallel Transition:**
 - Faster transition
 - Requires extensive coordination and resources
- **Queuing Models:**
 - M/M/s (Lahore) and M/M/2 (Karachi) queuing models
 - Efficient truck arrival and service rates

The team emphasizes the importance of selecting the approach based on the company's specific needs and capabilities.