MONASH INDUSTRY TEAM INITIATIVE (MITI) 2017-2018

Depot Of The Future

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SCOPE

Currently only having 8 tram depots around the city, Yarra Trams is beginning to plan for construction of a new depot in the near future. The MITI team, alongside with Yarra Trams, was given the project to design a smart autonomous depot which is environmentally friendly and flexible for the future.

METHODOLOGY

To achieve our goal, we conducted our research on depots around the world and in Melbourne. Depots such as Starr Gate (Blackpool), Les Ateliers (Dijon), Marconi (Brussels), Beverwaard (Rotterdam), Southbank and New Preston were extensively examined. Apart from this research, our site visit to New Preston Depot helped us gain valuable insights into the structure and operations of a modern tram depot. An additional site visit to Hawthorn Tram Museum allowed us to visualise the trend of trams over the years. As a result of the research, a flexible and well integrated depot layout was designed.

In addition to analysing other depots, ideas were gathered from trending technological advancements in other industries. These ideas consisted of integrating various technologies such as Artificial Intelligence (A.I.), robotics and smart devices throughout the depot to assist in safety, communications and daily tasks of employees. Furthermore, an autonomous underground storage is feasible and will assist employees further.

Moreover, to reduce the carbon footprint of this depot, a number of innovative and sustainable solutions were studied. Melbourne’s geological location assisted in identifying a number of feasible solutions that the depot could incorporate. Finally, to appeal to users, the depot was designed with a multi-level car park and outdoor/indoor recreational areas.

RECOMMENDATIONS

TECHNOLOGY
- Incorporation of A.I. for safety, surveillance, and movement of trams around the depot
- 3D diagnostic tools to more accurately determine tram defects
- Use of robotics in storage and cleaning
- Improved telecommunications

SELF SUSTAINING
- Solar Power (integrated with Li-ion batteries)
- Water Harvesting / Recycling
- Energy Piles
- Recyclable materials used in construction

FLEXIBLE
- Ability to house current and future trams
- Construction done in phases according to demand of facilities
- Certain parts of the depot can be moved and merged together
- Ability to be integrated into any location

LEARNINGS

Throughout this project, the team has developed a deeper understanding of the workings of a tram depot, as well as what good practices should be taken into account. With the project being very conceptual, we were able to come up with innovative ideas to incorporate technological and sustainable features throughout the depot, which we feel would be essential in the upcoming years.

ACKNOWLEDGEMENTS

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Indoor Recreational Area (New Preston Tram Depot)