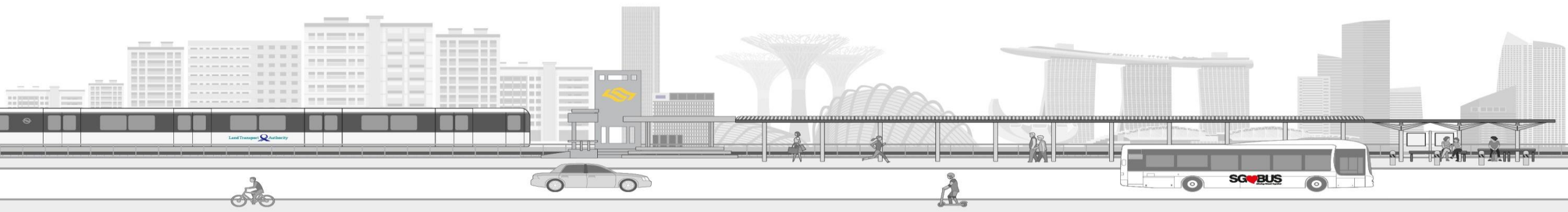


Theme 3: Safe Assets

Problem Statement 4:

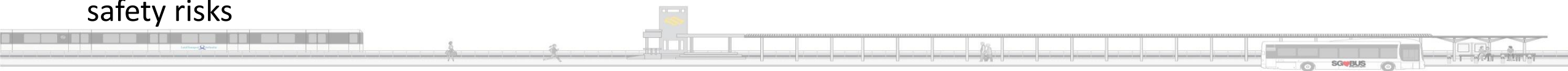
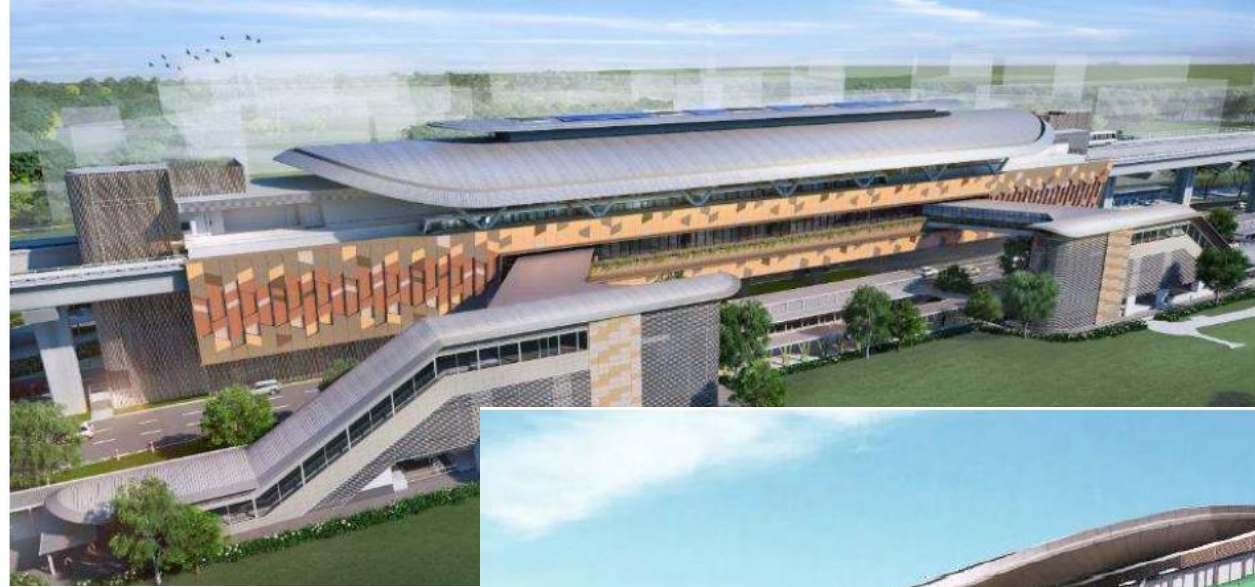
Develop a safe, efficient and low-cost automated cleaning solution for hard-to-access areas at MRT stations and depots without the need to use scaffolding, suspended gondolas, boom lifts or rope specialists

Presenter – Chua Swee Foon (Rail Assets Operations & Maintenance)



Challenges

- External access is usually **obstructed** by covered linkways, trees, lamp posts, bicycle parks etc.
- If station is at the centre median of road, application for permit for lane closure will be required to park a boom lift for cleaning
- Manpower intensive, time consuming, may need rope specialists and gondolas, safety risks



THEME 3: SAFE ASSETS

4. Cleaning of Facades at Train Stations & Depots

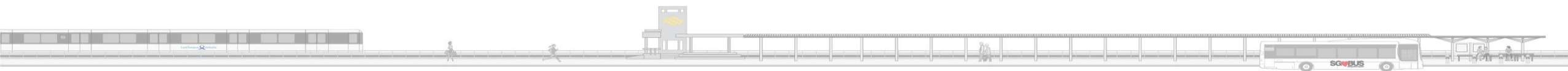
Cleaning of Claddings inside Stations



- Internal claddings or skylights are from **4m to 20m high**
- Cleaned using long poles
- Not all claddings can be reached using long pole

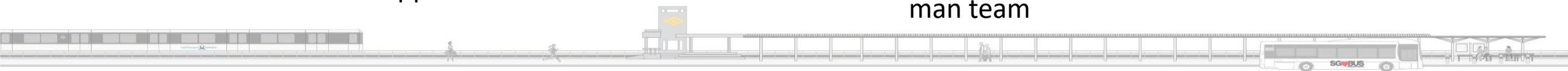


- Typical section of station about **10m high**
- Cleaned using long poles and personnel lift
- When cladding is beside escalator, it is unsafe for workers to stand on steep escalator to clean the cladding. Worker may fall down the escalator during cleaning



Requirements

- Must be portable and easy to deploy, carried by two men
- Able to be transported by twin-cab vehicle to the station
- Preferably, can tap on electrical switch socket outlets in stations
- Suitable to clean glass, aluminium and vitreous enamel panels
- Equipment must navigate over or around mullions or spider clamps which may obstruct its passage
- Can map co-ordinates to ensure all surface areas are thoroughly cleaned
- Able to operate on slopes up to 60° on external façades and internal claddings
- To have local O&M support
- For external façade, wet cleaning is required. For internal claddings, dry wipe is allowed as a solution. If water spray is used for internal cladding, need to keep the floor below dry during cleaning
- Avoid use of drones as permits are required from CAAS
- Can tether rope but should not need to employ rope specialists to secure to anchor points
- Target >33% savings of CAPEX +OPEX compared to current method over the useful life of the proposed solution
- Lesser time to clean the same surface compared to current method use
- >50% in manpower or no more than 4-man team



4. Cleaning of Facades at Train Stations & Depots

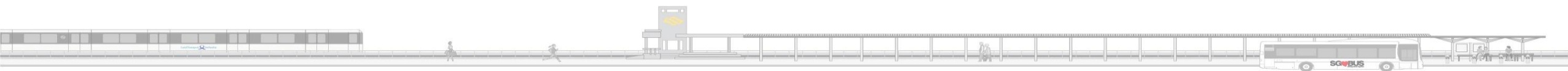
Questions & Answers

Q1: Frequency of cleaning, duration of contracts.

A1: Frequency of high level cleaning is between 6 months to 2 years. A cleaning contract varies between 4 to 5 years depending on the number and size of stations for the contract.

Q2: What are the safety and inspection requirements that the solution need to comply with?

A2: The solution must not fall from height during cleaning as it may injure people or damage the signage, passenger information system, lights and any other assets in the station.



Thank You



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