Kauhale Kakaako Parking Garage

Elevator Audit & Assessment Report

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Date: January 17, 2023

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Kauhale Kakaako Parking Garage
860 Halekauwila Street
Honolulu, HI 96813
Two (2) Passenger Elevators

Re: Elevator Equipment Audit & Assessment

Innovative Elevator Consulting, Inc. (IEC) conducted a survey of the elevators at Kauhale Kakaako Parking Garage to identify existing equipment data, assess the overall operating condition of the elevators and provide recommendations for equipment improvement. Included within the written report of our survey, we've included some of our survey pictures for reference.

A. AUDIT SUMMARY

General Overview

The elevators were permitted and installed in 1993 and his original Otis Elevator equipment. These were distinct elevators with glass hoistways and glass back cabs. While they are unique and distinct, they do present some different challenges from standard elevators. The high usage of the elevators for the parking structure used both by residents, monthly and daily parkers are a concern for hydraulic based elevator systems.

Overall, the elevators are running average with a few operational problems with doors and overall floor to floor operation. Many of the components are showing typical signs of outdoor environment usage and the general exposure to Hawaii's weather conditions. Still, given the operating environment which has not changed since installation, consistent and preventive maintenance could be improved to ensure reliable operation for its users.

B. MAJOR COMPONENT ASSESSMENTS

Elevator Glass Hoistways

We are addressing the hoistways as a separate item as work for them will have to be a coordinated effort. There are signs of water infiltration into the hoistway from various areas of the glass enclosure. Over time, with general weather impacts and sun light, the seals of the glass panels will need to be replaced and the entire hoistway resealed. This may also include rust abatement of the various metal framing around each glass panel. We highly recommend rust abatement along with electrostatic painting of all metal surfaces to extend the life of the steel hoistway structure.

The challenge will of course be access and working areas. There may be ways to work on the lower floors by raising the elevator and using ladders, etc. but safety evaluation and job hazard analysis' will be required to meet all OSHA requirements. We know for sure that an elevator contractor will be required to assist with elevator securing, running, and/or operating while work crews use the elevator car tops to conduct work.

More detailed discussions and planning will be required to address this either as a separate project, or coordination during the planned elevator modernization.

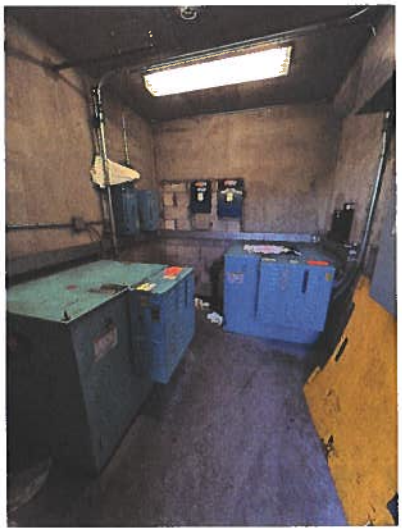
Elevator Machine Room

The elevator machine room is considered a remote machine room and is located approximately 20-30 feet from the elevator hoistways. While we understand the building design and location of the room, it does present a challenging issue with the hydraulic to and from piping. The current to and from piping is buried underground, and is running under the current sidewalk, into the grass area and then penetrated into the hoistway from the diamond head side. Both elevator's to and from piping can been seen from the underground penetration into the elevator pits. The largest concern

is the piping is not visible and the only method of monitoring any leak, is to constantly measure and monitor the oil levels in the hydraulic tanks and any scavenger pump and oil return lines to the machine room.

During modernization, the State Inspection Bureau will NOT require to and from piping to be re-installed above ground or visible, but we highly recommend this modification to ensure safe monitoring and maintenance of this line going forward. An underground leak, especially if not detected in a timely manner, will result in OSHA contamination reporting, clean-up, etc., including the unplanned disruption of the entire access to and from the garage. Again, this will should be addressed in further detail during the modernization planning stage.

The machine room operating components are code compliant which includes compliant power disconnects, lighting, smoke fire recall systems. During the modernization, it will be an opportune time to make changes to the current fire panel operation and location since the current system is integrated with the condominium system. A separate operating and monitoring system for just these elevators should be installed at that time.

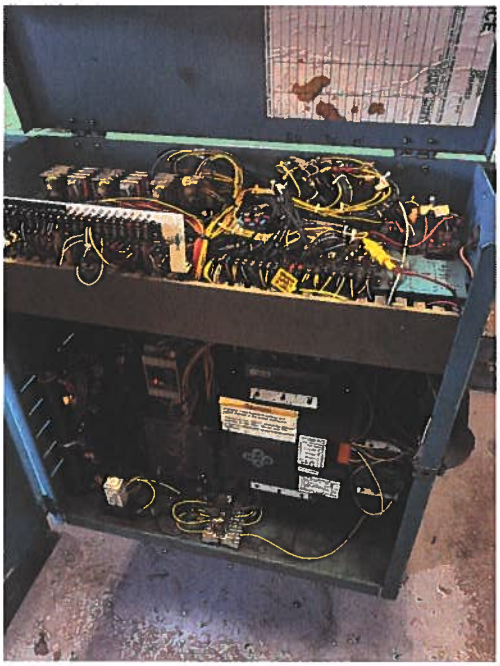


Elevator Controller

The controllers for these elevators are Otis Oildraulic. Otis installed numerous versions of this model throughout the world but quickly moved to a more updated and reliable system called an Otis 211M. These controllers are obsolete and replacement parts are refurbished versions. Otis has discontinued making original replacement parts due to high costs, so proper planning should be made for modernization. The control system is known to be reliable, and despite its age, it's still performing well and functional. Technical knowledge and resources are decreasing as many of the technicians who installed and worked on these are retiring but maintaining them in the short-term should not be an issue.

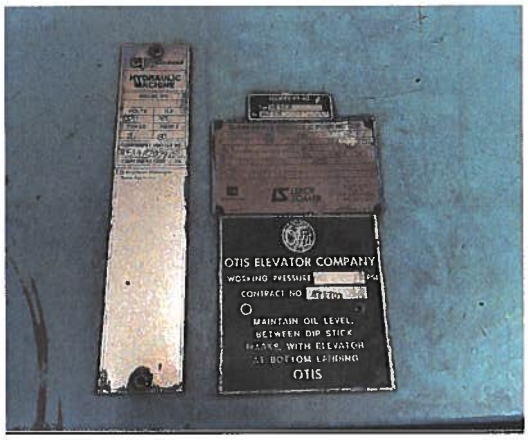
The controllers also contain a starter which receives the building's power and "starts" the elevator by transferring the power to the elevator. The current starters are an older model "soft-start", but we weren't ablet to verify its lifespan or longevity, so this will need to be monitored for replacement should failure occur prior to modernization. Starters are now designed and engineered as "soft start", which allows the power to be slowly ramped up the voltage and amperage needed to power the elevator based on the demand required. Much smoother, quieter and longer-lasting equipment operation is the result.

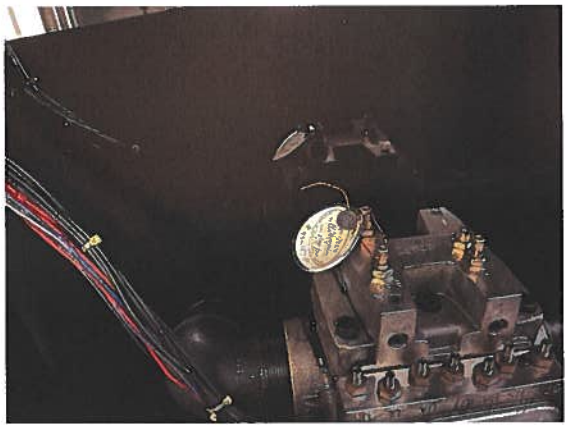
The control system also has a related component called an Automated Return Unit (ARU), which is a battery back-up system which will provide short term, temporary power, when there is a power loss to the elevator. This back-up system will provide enough power to allow the elevator to lower itself to the nearest, safest floor, and allow anyone inside to exit. This is a valuable feature for buildings and elevators, which are not tied into an emergency generator system. The current Otis Aut-o-safe is also obsolete but is compatible with the current control system. This can also be updated during the modernization.

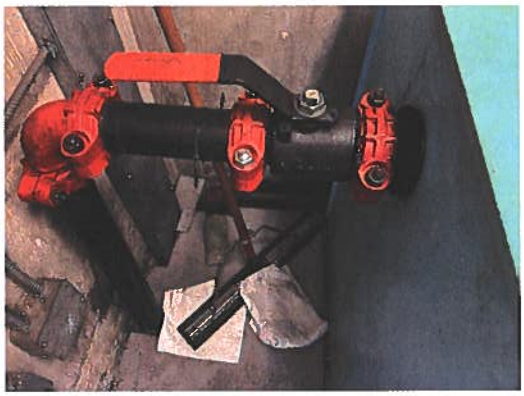


Elevator Power Unit

The current "machine" is a hydraulic Power Unit manufactured by Otis. The power unit is known as a submersible system with a pump motor, valve and muffler all self-contained in the hydraulic tank, with the oil which operates the system. There are numerous benefits to this set-up, all components are constantly lubricated, no external leaking of equipment and sound deadening within the tank unit. This power unit is operating well, and no signs of operating issues were present. The current valves on all elevators are Maxton (brand) valves and are known to be the top performing valve in the industry. The state approved and tested data tag showed the last safety test conducted in August 2021, so the test and inspections are up to date at this point.





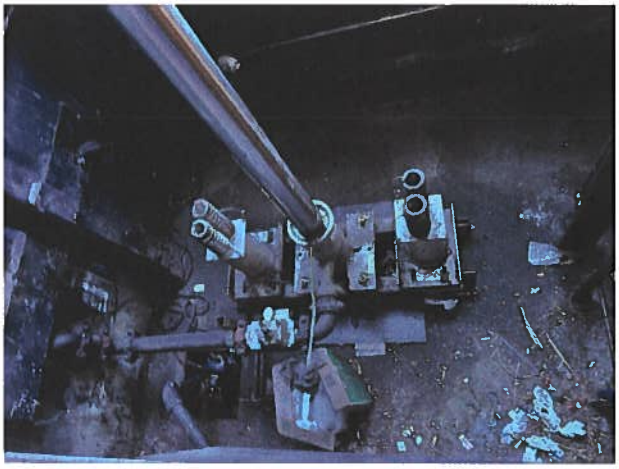


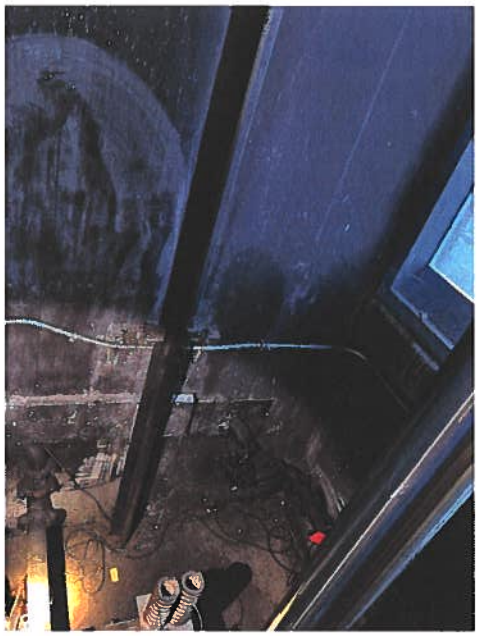
Elevator Hydraulic System

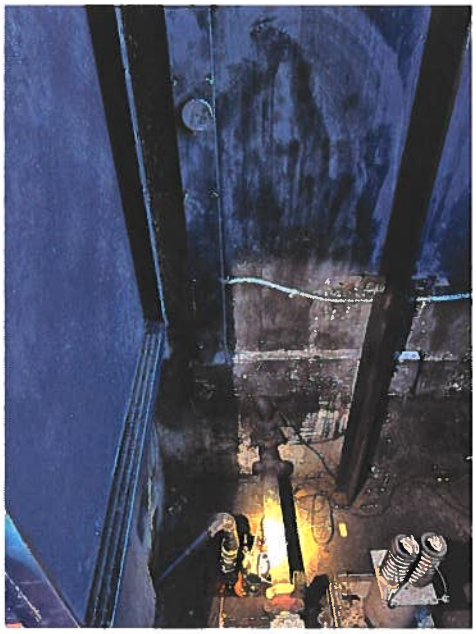
The existing hydraulic systems has an "in-ground", single piston system. It utilizes a one-piece, piston which travels underground to the depth as far as it goes up to the top floor. In speaking with Elevator Services, both elevators experienced underground piston failures, and both were replaced with new undergrounds systems. The pistons appeared to be in good condition, is well-lubricated, with no scarring or leaking from the main packing.

However, we did notice some oil in the elevator pit and could not determine the exact source location, so we've asked Elevator Services to monitor the seals on the to and from piping, or the packing from each elevator for repair.

As part of maintenance servicing, there should be an oil log showing oil levels in the hydraulic tank, but we did not see or record them. This is another item we recommend Elevator Services keep in the machine room for reference and upkeep.







Door Components

The doors are operated by Otis i-Motion door operators and are well-suited for these types of elevators. Unfortunately, Otis has stopped manufacturing these operators and support for them from a parts perspective is rapidly decreasing. Thus, this is another component which should be monitored for replacement or may be replaced during the planned modernization. However, when this operator is coupled with robust, reliable door hardware components, door operation should be very reliable. The Otis door interlocks, integral hangers, closers, rollers and upthrusts make up a great door package, which in IEC's opinion, is the best in the industry. However, we did notice the chain linkage for both elevators are not in good condition and should be replaced prior to failure. We also noticed surface rust and corrosion setting in on the door components, so it would be a good idea to work on preventive repairs to remove the corrosion and paint the tracks to ensure a smooth operating surface for door travel. This work can also be addressed during modernization.

Unfortunately, the rust and corrosion has extended to the hoistway doors (doors on each floor) and the hoistway frames & returns (frames on each floor). There are multiple floors with visible rust and corrosion, some of which may be sanded, treated and painted. Some of the strike returns are beyond repair, so those will need to be replaced to provide a strong, rigid return for door closure. The doors on each floor have been painted on several occasions so they are hanging in there but may need a once over to remove corrosion scaling and repainting in the future.

The infrared door protection device monitors door opening and closing when the "beam" is broken to re-open the doors. The current models are Otis Lambda, which are obsolete. Thus, it may be a good idea to investigate upgrading this in the future to ensure users are kept safe and the opening device is working properly.

Door related problems make up approximately 70-80% of all elevator related issues. Thus, if maintenance and replacement of door components are performed on a normal, consistent basis, then you've just addressed the highest probable cause of elevator problems. During our survey we did notice several floors need to have door maintenance performed and we will enter that as punch-list items for Elevator Services to address.

Elevator Car Enclosure & Signal Fixtures

The cab enclosure is the "box" that everyone rides in when using the elevator. As mentioned above, the current cab shell is a custom design and unique with a glass-back wall. While it is an upgraded model, it also presents a challenge with maintenance and ensuring the structure and seals are in

place to prevent any type of infiltration to the cab. When the elevator hoistways are addressed, we recommend doing the same to the cab shell and confirm its structural integrity and any seals are replaced.

The side interior walls may be replaced with new plastic laminated panels along with a new ceiling for a complete cab upgrade.

The signal fixtures are original Otis M2 models with plastic buttons. These are not the most conducive for the operating environment, so modernization will allow the installation of more robust and vandal-resistant versions of buttons, indicators and fixtures.

C. ELEVATOR CONTRACTOR PUNCH LIST

Based on the findings of our survey, there are a few punch list items for Otis to address.

Punchlist Item	Action Item
Hoistways	Address glass panel seals, painting of metal framing, stop/reduce water infiltration
Controller board & relays	Monitor for obsolescence
Controller Soft Start	Monitor for obsolescence
Automated Return Unit	Obsolete
Elevator Pit - oil leak	Elevator Services to clean & find source
Oil log	Elevator Services to place log in machine room
Door Operator	Replace linkage chain on both elevators
Hoistway Door Components	Perform maintenance; replace door rollers, spirator cords and check closers

Hoistway Door Components	Plan for rust abatement project
Hoistway Doors & Strike Returns	Rust abate & paint; replace strike returns due to rust and structural supports
Otis Lambda Door Detectors	Monitor for obsolescence
Cab Enclosure – glass back wall	Check and reseal with hoistway work

D. UPGRADE RECOMMENDATIONS & ESTIMEATED LIFE EXPECTANCY

As mentioned in the report, the elevator equipment and operation are in average condition and could use a little more care. Although there aren't urgent concerns, some of the items discussed in the report are in the slow process of worsening condition, so a plan should be implemented to address them prior to a large, unplanned failure.

Complete Modernization Planning

There is no "crystal ball" which will say what the life expectancy of the equipment is, but based on the equipment type, current usage and building make-up, modernization should be planned in the next 1-2 years. This is mostly due to the operating conditions and environment and the current state of the equipment.

Complete Scope – this would entail a complete upgrade of the major components (controller, power unit, door operator, door & frame repairs, cab work. new interiors, signal fixtures) and RETAINING the existing underground piston and cylinder system.

Here are the estimated costs PER ELEVATOR:

Elevator Scope Cost: $270,000
Elevator Related Work: $30,000
Total Elevator Costs: $300,000

*Please note these are budgetary figures which are based on today's material and labor pricing.

Other Related Costs NOT Included:

- Underground To & From Piping to Above Ground
- Hoistway Glass Repairs & Metal rust abatement and painting

Thank you for allowing us the opportunity to complete the assessment of your elevator. We'll be happy to meet with you and Board when appropriate to review this information. If you have any questions on the content of this report, please contact me at 808-349-4751, or via email at jared@iec-hawaii.com.

Sincerely.

Innovative Elevator Consulting, Inc.

Jared Okamura & Nathan Lee

Jared Okamura / Nathan Lee