

# Star Elevator Modernization **The Metropolis Trust Building**



# The Metropolis Trust Building Overview



## LOCATION

625 Market Street, San Francisco, CA

## YEAR BUILT

Early 1907, after The Great 1906 San Francisco Earthquake.

## CHALLENGE

Untangle an early 20th century, perplexing criss-cross cable designed gearless basement traction elevator system and convert into a modern, overhead traction variable frequency controlled AC gearless system.

## SOLUTION

Completely re-engineer the existing offset basement design. Replace with an overhead, modern, compact, energy efficient, gearless AC machines, counterweights and rails. Install microprocessor AC (VVVF/AC drives and controllers).

San Francisco in 1907. The City is still shaken from the aftermath of one of the most significant earthquakes of all time. However, The City is surging back to life; rising from the rubble. New building projects are in motion – modern structures will soon line Market Street.

Today, The Metropolis Trust Building sits amongst the most expensive real estate in San Francisco. 625 Market is a designated Category 1 Historic Landmark with a vertical transportation system still anchored in the past – a retrofit of machinery installed over 100 years ago. 21st century safety concerns meet turn-of-the-century building techniques. And there's no app to solve this one. The elevator systems were all operating well beyond their expected life.

## Situation

This project was commissioned to convert an early 20th century gearless basement traction elevator group into a modern, overhead traction variable frequency controlled AC gearless system.

Project parameters included upgrading the rail systems to bring them up to modern seismic code. New pushbutton and signal fixtures, and modern cab interiors would also be added.

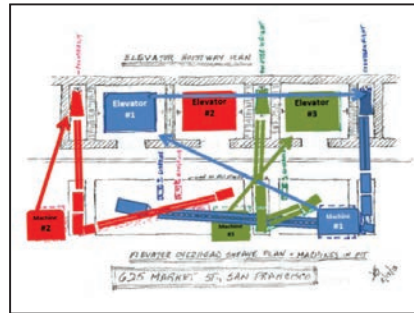
Elevators were not operating reliably – issues with machine bearings and motor commutators kept cars out of service. In fact, car #1 had been intentionally disabled due to reliability concerns.

Building Management was intent on tenant satisfaction, safe operation, and improved structural integrity, as the historic building approached its second century of operation.

Enter Star Elevator. Despite the project's inherent complexity, the team was not afraid to roll up its sleeves to solve the 15-story challenge.

## The criss-cross crisis

First order of business was untangling the tricks of 1907 tradesmen – including a confounding criss-cross cable system.



*This sketch created by John Sellen of JESellen Consulting illustrates the unique challenge of this project.*

The elevators had a very unique roping configuration. Due to the placement of the machines under the hoistways, and the need for proper rope lead off of the overhead sheaves, the counterweights did not run in the same hoistways as the cars. This makes for a long, complicated rope scheme – each car had over ¾ of a mile of hoist rope!

To further complicate matters, there were no building blueprints available. So the team turned to Rich Blaska from RCB Elevator Consulting, LLC. to draw up a detailed plan for everyone to follow

## Execution

The focus was on job sequencing and scheduling. It was important to keep the building in operation, and keep an elevator running reliably and safely at all times.

Due to the unique rope configuration, it was necessary to shut down two cars at the same time. One car would have to service the building for months, before a modernized car was completed and returned to use.

Every step of the modernization process was a challenge. The Metropolis Trust Building is located on one of the busiest corners in San Francisco; so there was no chance to use cranes. And the building itself offered limited access; there was no loading dock or service entrance. All equipment had to enter through the front door – including 20' pieces of reinforcing steel and 4,000 lb gearless hoist machines.

The cabs themselves were disassembled to provide a platform so that the hoist machines could be brought up through the existing hoistways. The machines were set in position 40 inches above the deck in order to achieve the proper traction angle on the drive sheaves.

## Outcome

The elevators are now in standard configuration. The new machines are overhead traction and the counterweights run in the same hoistway as the cars. This layout offers improved long-term safety, reliability and serviceability of the system.

## Cost Savings / Efficiency

Power consumption is down 45% - 50% annually

## Performance Improvements

The new system eliminates three AC / DC converters

**This modernized configuration offers improved speed, long-term safety, reliability and serviceability of the system and a significant energy savings.**

As the decades pass, the controls can be updated to whatever is standard at the time; but the configuration can remain. Future modernizations will always be simpler and more straightforward.

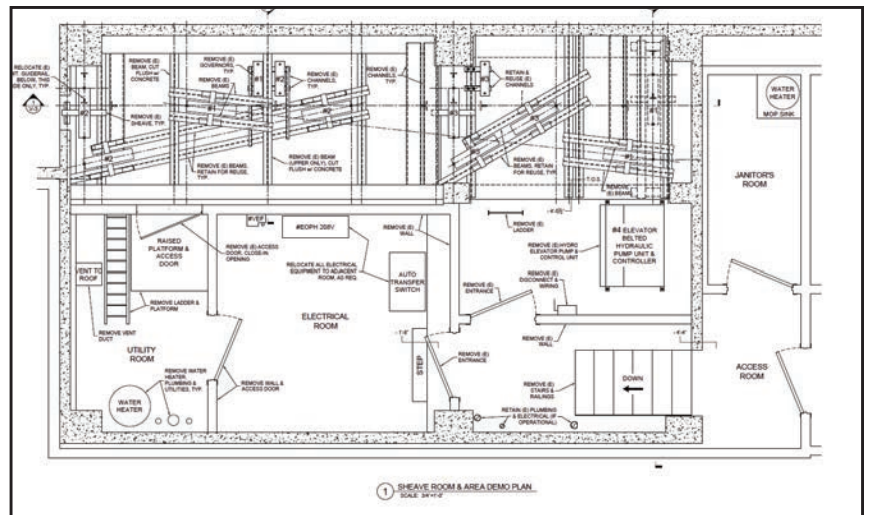
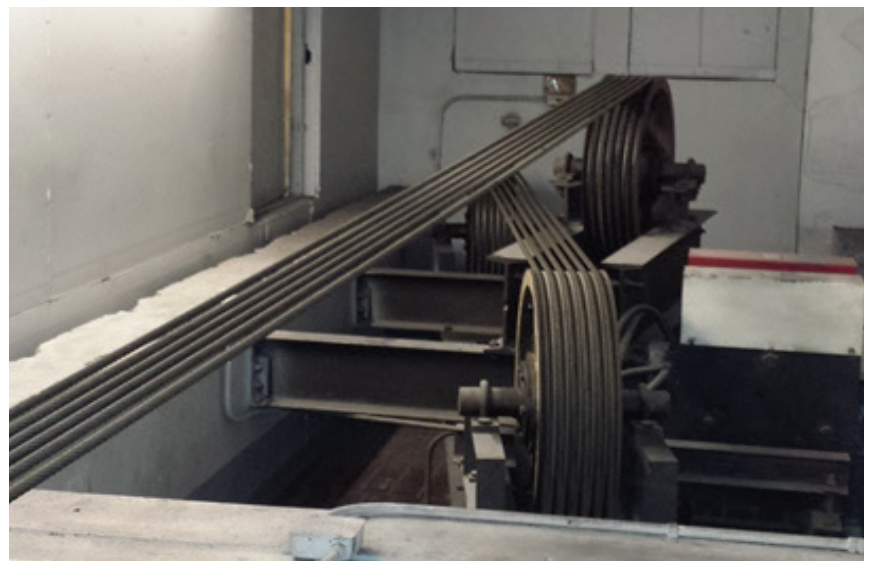
The teamwork between all partners made this project into a shining success story. Cooperation and collaboration are vital on a project of this size and scope. Success is assured when all parties understand that it's 'them against the problem' – not 'them against each other.'

# Star Elevator Modernization The Metropolis Trust Building

## Pre-Modernization Layout

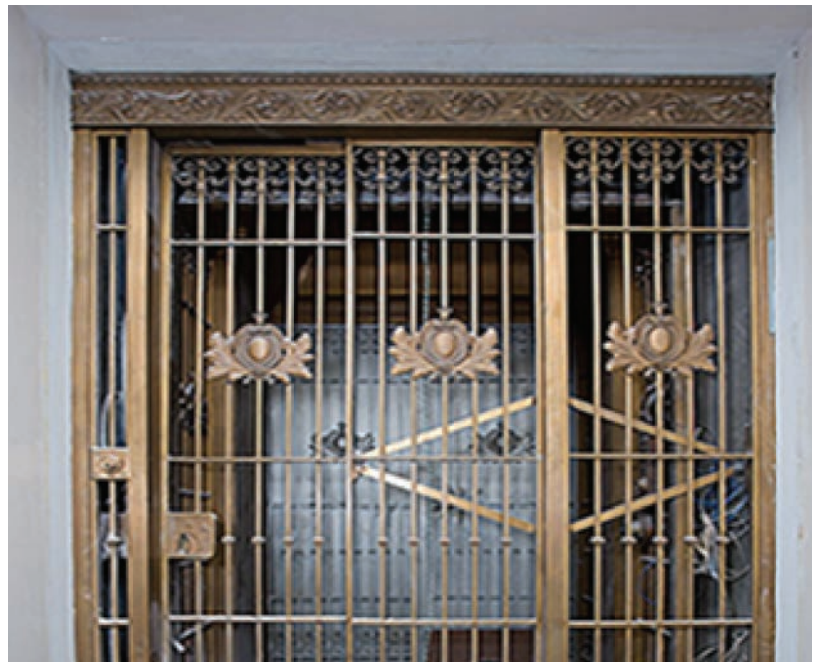
The gearless machines were base-ment-mounted and remote to their respective cars. Machine and counterweight for the far left elevator #1 was located on the far right. Machine and counterweight for the middle elevator #2 was located to the far left. Machine and counterweight for the far right elevator #3 was located in the middle. This results in an overhead sheave space with deflector sheaves and cables criss-crossing each other and different elevations.

Because of cables and deflectors inter-lacing in the overhead, it was necessary to have two elevators out of service to modernize any of the elevators - leaving only one aging, gearless elevator to serve the entire building.





Three elevators, originally with manual car-switch operation had been updated to push button switches at some point.



When originally built the elevators were a 'Birdcage' design, with open grillwork



Early 1900s gearless basement traction elevators



Existing motor drive technology was variable voltage control to a DC gearless hoistmotor – very common in the 1900s



Modernized by Westinghouse in the 1960s with RSBL VV control



Leading technology, MCE iControls.



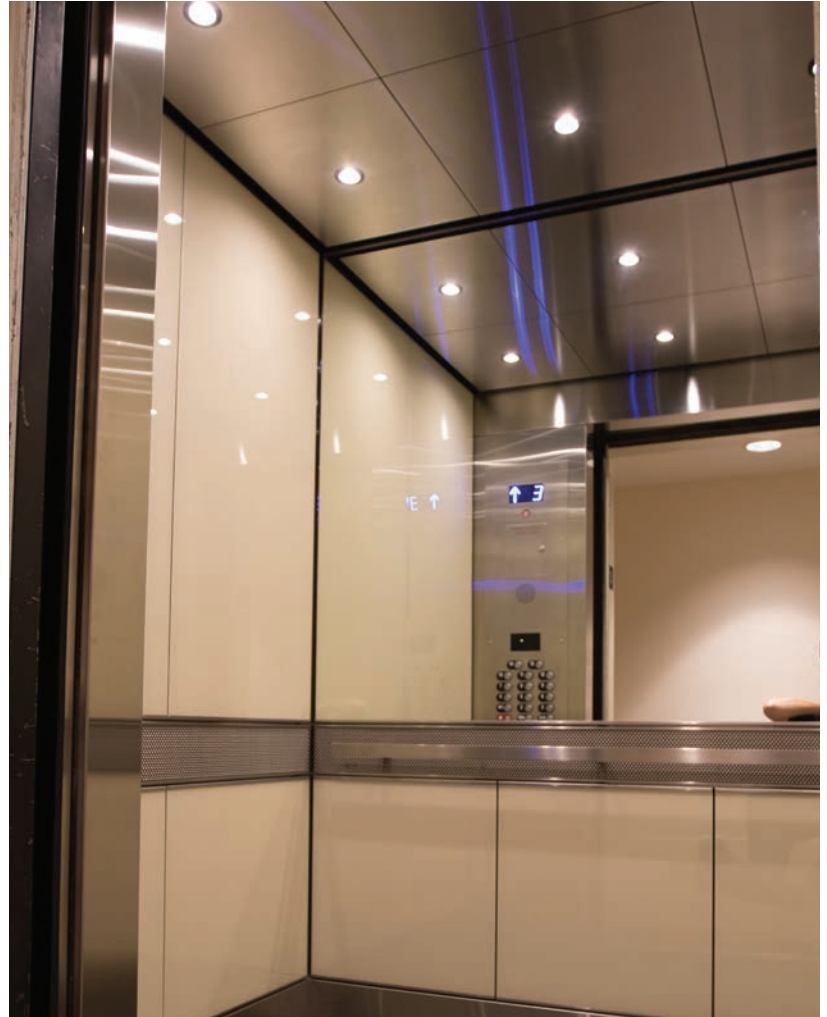
The distance between the counterweight rails was too small for the installation of new counterweights. So on each elevator, one counterweight rail stack had to be moved out over 10" to accommodate the new counterweight frame.



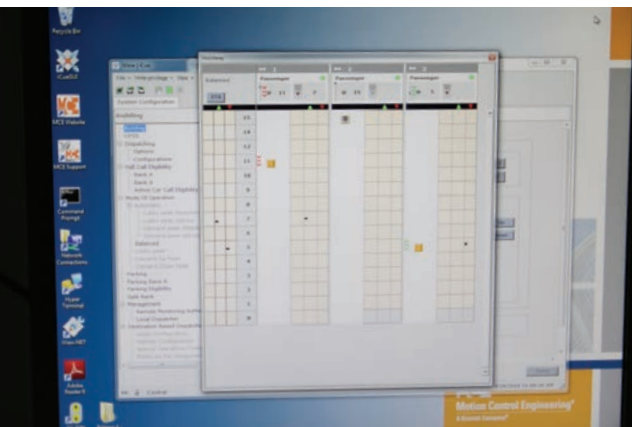
Modern hoist machine and control system utilizes the latest technologies for power savings and efficiency.



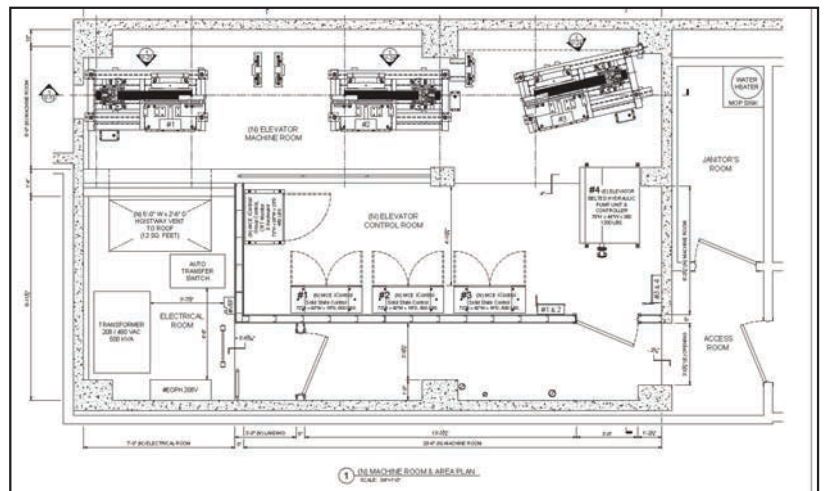
New door finishes to match the buildings history.



New cab interiors by Unique Elevator Interiors for a class A downtown San Francisco building



Latest technology MCE iControl elevator controls



Design drawings by Rich Blaska of RCB Elevator Consulting, LLC.



**JOHN SELLEN**

JE Sellen Consulting

(415) 430-8027

325 Sausalito Blvd.  
Sausalito, California  
94965

*Project Leader for work  
at The Metropolis Trust Building.*

**RICH BLASKA**

RCB Elevator  
Consulting, LLC.

415-350-0402

2117 Bush St.  
San Francisco, CA 94115

*Design, layout and engineering. Rich  
assembled a set of straightforward  
drawings that made this complex  
job more understandable for esti-  
mating.*

**GARY SOMMESE**

Star Elevator

(650) 631-3999

1300 Industrial Road, Suite 4, S  
an Carlos, CA 94070

*Mechanic leading the project.  
Along with a high level of technical  
expertise, Gary maintained direct  
communication with building man-  
agement throughout the process –  
invaluable during the long, complex  
job.*

**JIM SOMMESE**

Star Elevator

(650) 631-3999

1300 Industrial Road, Suite 4,  
San Carlos, CA 94070

*Project Foreman - was instrumental  
in providing technical and logisti-  
cal support to keep the project on  
track.*

**ADAM ROBINOW**

Star Elevator

(650) 631-3999

1300 Industrial Road, Suite 4,  
San Carlos, CA 94070

*Apprentice. The experience he  
gained working during this project  
will serve him well as he progresses  
to the position of mechanic in the  
elevator trade.*

**RICK GILMORE**

Star Elevator

(650) 631-3999

1300 Industrial Road, Suite 4,  
San Carlos, CA 94070

*Operations Manager.  
Rick formulated the project bid  
estimate. He created and presented  
the complex job sequencing plan  
to accomplish the goal of modern-  
izing the elevators safely while still  
keeping one elevator in operation  
for tenants.*

**CHRISSE HARRIS**

Alhouse Deaton  
Management

(925) 935-0351

625 Market Street,  
Suite 800

San Francisco, CA 94105

*Senior Property Manager of The  
Metropolis Trust Building.*

**BUILDING OWNER**

Sun Life Assurance  
Company

**PAT O'HARA &  
BOB JESSUP**

Yerba Buena Builders Inc.

(415) 861-4269

725 California Ave.  
- Treasure Island  
San Francisco, CA 94130

*General Contractor for project.*



**THE METROPOLIS TRUST BUILDING**

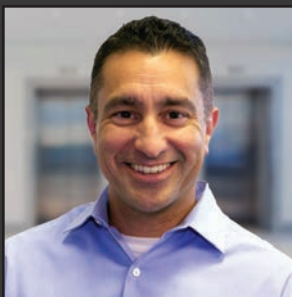
275 daily tenants  
71,141 sq ft.  
15 stories tall

This elevator modernization of one of San Francisco's premier post 1906 Earthquake building is a remarkable feat of engineering. This kind of modernization project demands an expertise that few elevator companies possess today.

**This is one of the highest profile elevator modernizations done anywhere and deserves to win the Elevator World Project of the year because:**

- The age of the building (1907)
- The building location on one of the busiest intersections in San Francisco (and most valuable).
- A unique criss cross cable system layout
- No building blueprints available.
- Early 20th century gearless basement traction elevator group location
- Upgrade rail systems to bring up to modern seismic code
- Create minimum disruption to the 275 tenants
- Limited access; no loading dock or service entrance. All equipment had to enter through the front door – including 20' pieces of reinforcing steel and 4,000 lb gearless hoist machines.
- New machines are overhead traction and the counterweights run in the same hoistway as the cars.
- Power consumption is down 45% - 50% annually
- The teamwork between all partners made this project into a shining success story.

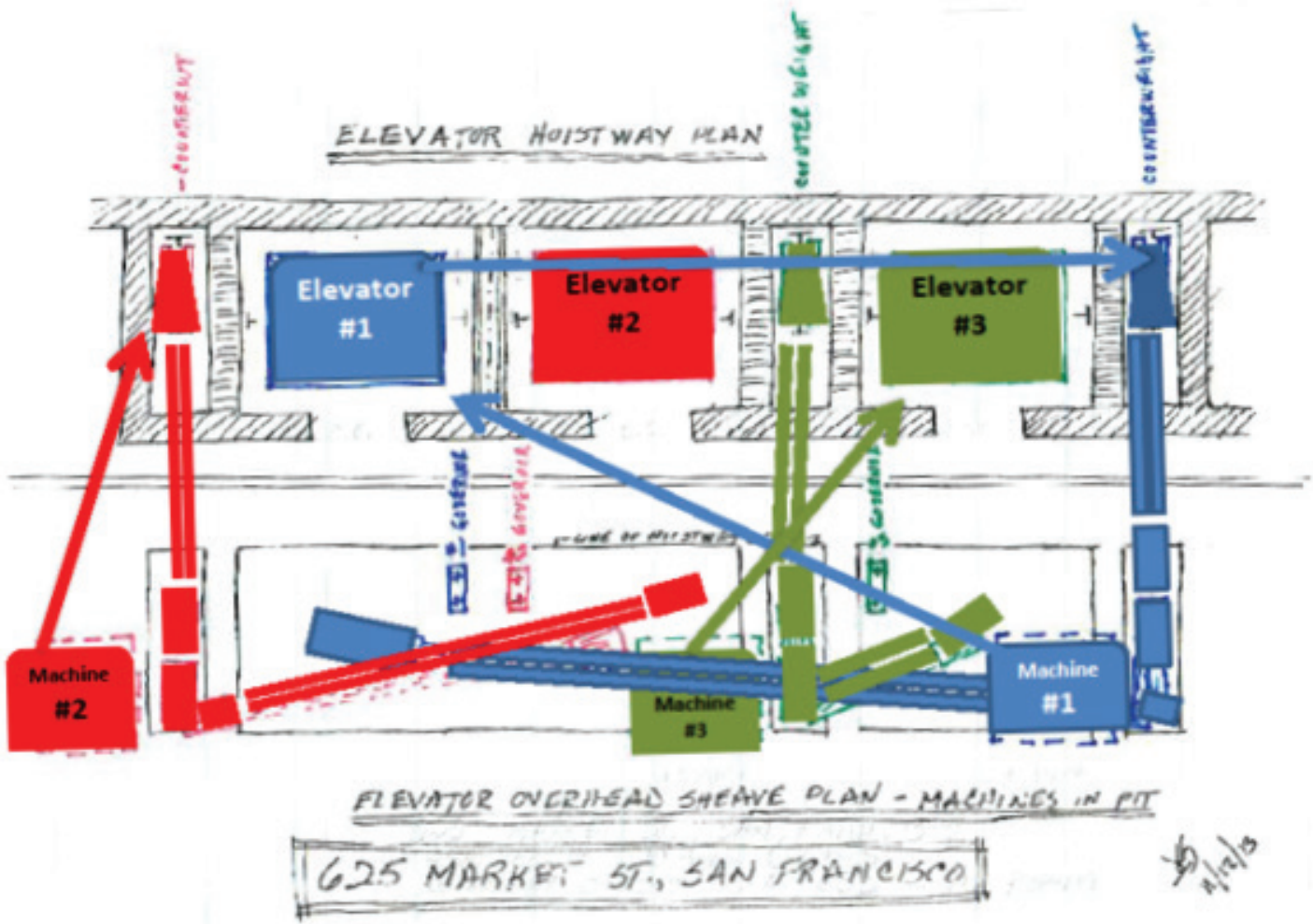
#### *About the Author*



**RICK NIEVA**  
**Vice President and Sales Manager**  
**Star Elevator**

*Rick Nieva worked as an Apprentice in the Local 8, International Union of Elevator Constructors prior to attending Sonoma State University where he earned a Bachelor of Science degree in Finance. After college he worked in corporate finance for tech companies for 9 years. At that point he decided to come back to the elevator industry and has held his current role for the last 11 years.*





Original Elevator overhead sheave plan.



Original unique roping configuration.



Original unique roping configuration.



Hoisting up new equipment through elevator shaft. This was necessary because no crain can be used on this location on Market Street in San Francisco.



New equipment in overhead location.

















Old elevator controls.



Ribbon cutting ceremony with the team to celebrate the completion of this project.

625 MARKET STREET  
Originally  
"THE METROPOLIS TRUST  
BUILDING"

---

CONSTRUCTED 1907  
ARCHITECT: GEORGE APPLGARTH

---

A CATEGORY I  
HISTORIC LANDMARK