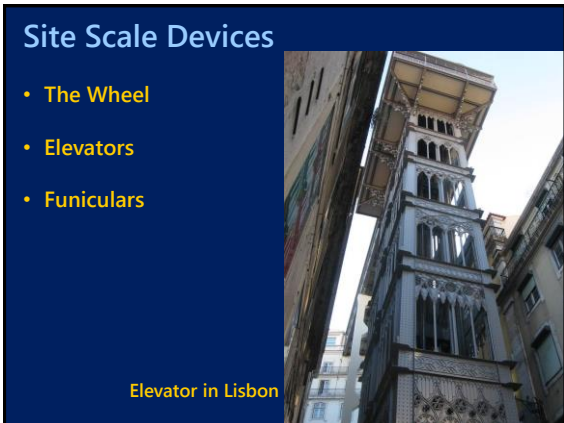


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2



3

Funiculars

Steep slopes in hilly towns



4

CAT-water-powered



Water-Balanced Cliff Railway

The two carriages are linked together with a steel cable, so that when one carriage goes down the other is pulled up. When people need to go up or down water flows into a tank in the top carriage until it is heavy enough to pull the lower carriage up, the brakes are released and gravity does the rest!

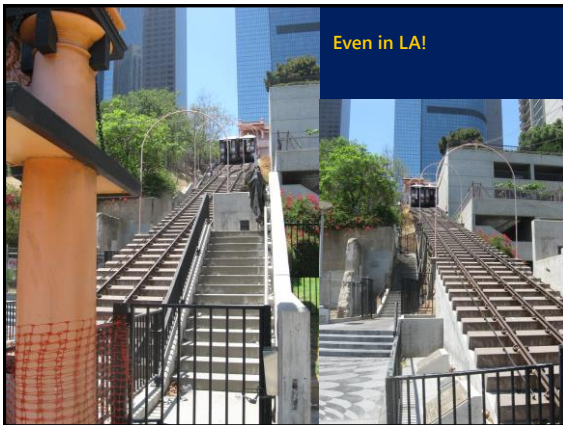
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8

Types of Devices

DEVICE	SLOPE	CAPACITY	SPEED
Moving walkway	< 5°	high	moderately slow
Moving ramp	< 15°	high	moderately slow
Escalator	~ 30° high	high	moderate
Elevator	vertical	moderate	slow to fast

9



Moving Walkway
United Terminal, ORD—Helmut Jahn

10



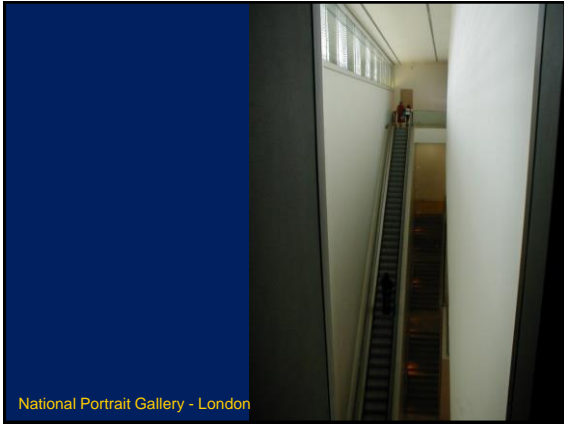
Escalator
Pompidou Ctr.-Paris

11

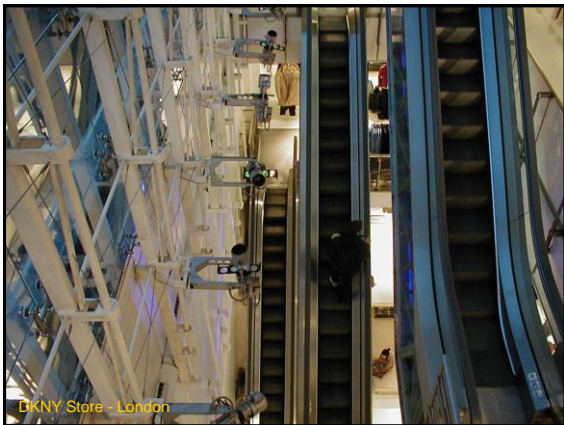


Princes Arcade - Glasgow

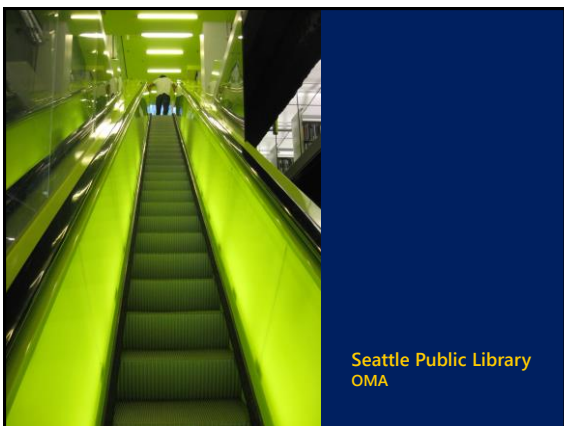
12



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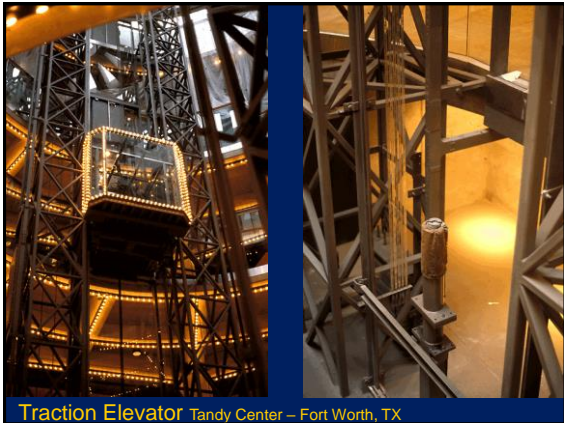


15

Elevator Types

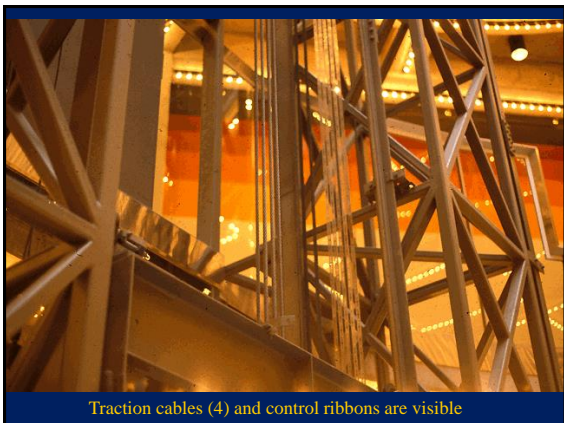
- traction: supported from cables
- hydraulic: supported by piston
- rack and pinion: no cables, no pistons
- mag-lev: no cables, no pistons, vertical & horizontal (since 2016)

16



Traction Elevator Tandy Center – Fort Worth, TX

17

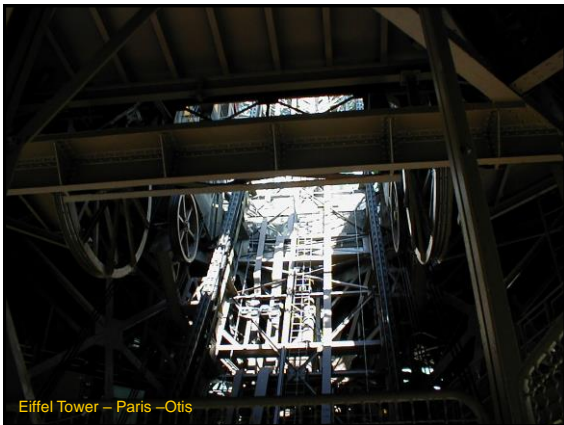


Traction cables (4) and control ribbons are visible

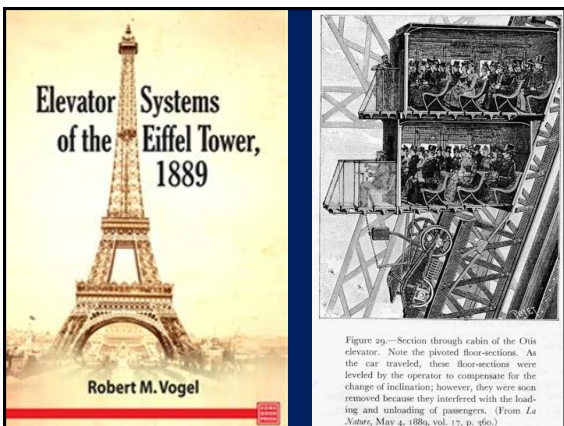
18



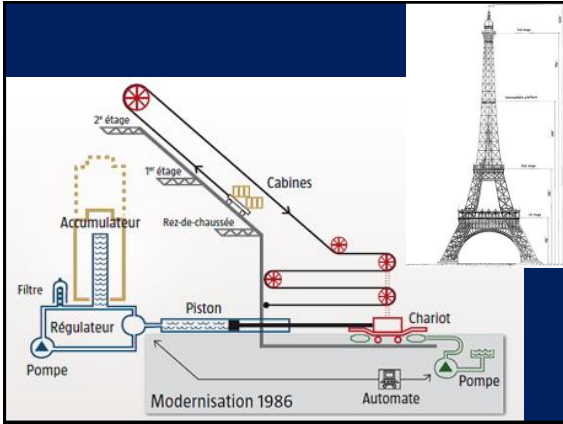
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22



To the first and second platform.....and to the third platform

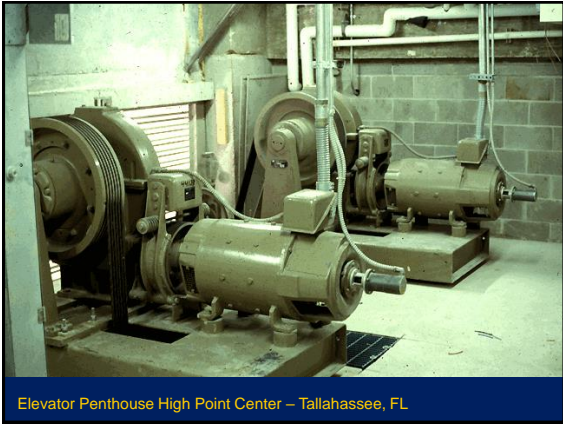
23

Twin Elevators

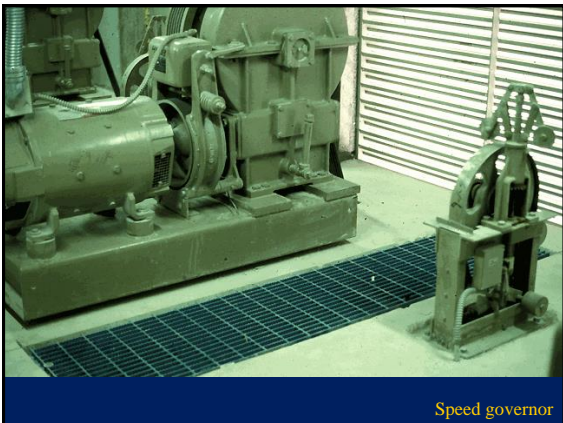
2 cars can operate in the same shaft

"Unlike a double-deck elevator system, TWIN can park one cab while the other stays in operation," the company's website states. "So when passenger volumes are low, no energy is consumed by moving empty cars. Furthermore, all TWIN elevator systems can be equipped with an energy recovery function that can feed about 30 percent of the energy generated by braking back into the building's power grid."

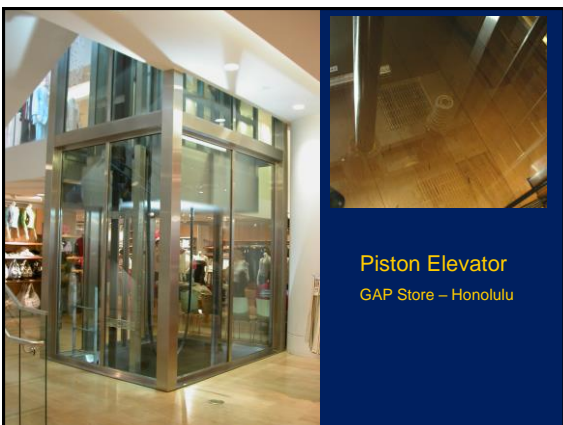
24



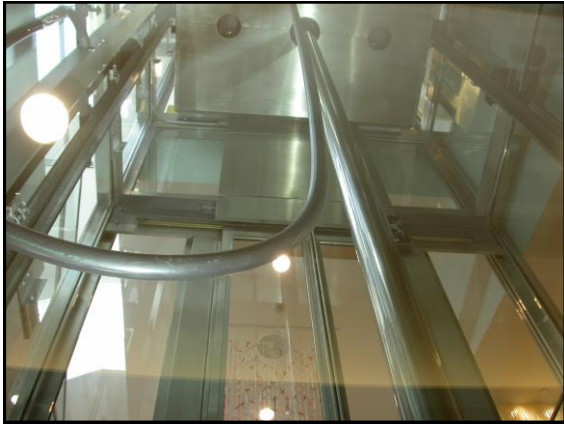
25



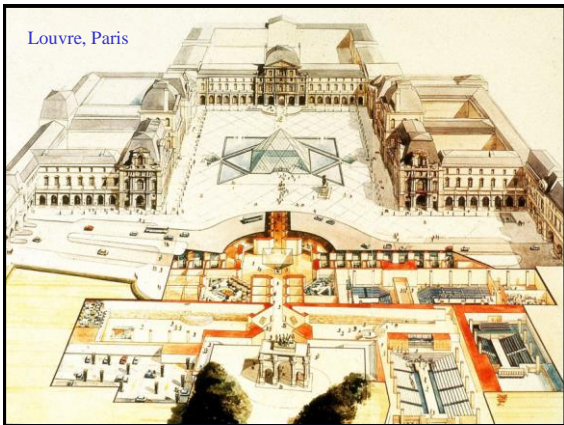
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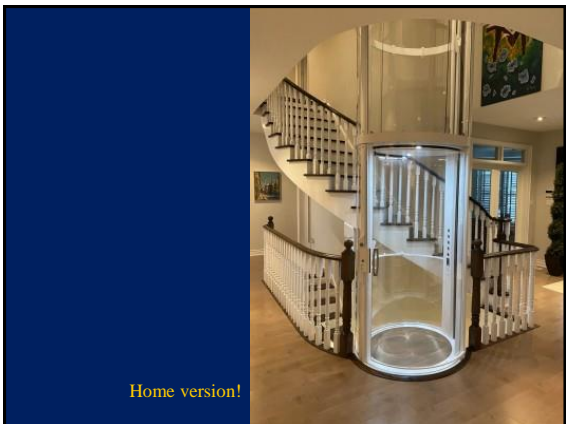
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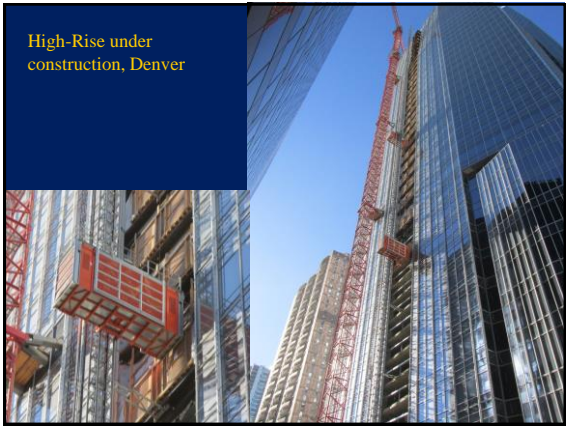
34



35



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High-Rise under construction, Denver

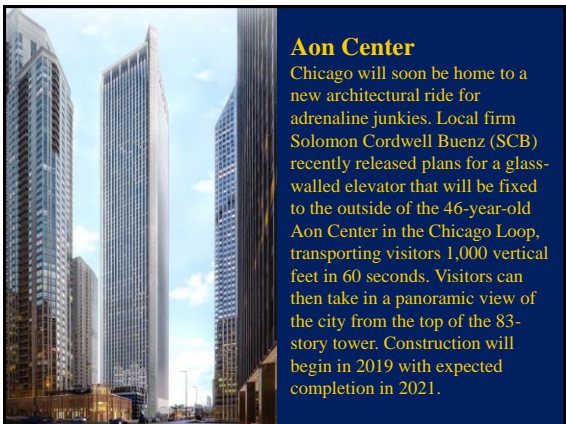
37



Rack and pinion remodel

Standard Hotel, Camden UK
Before and after

38



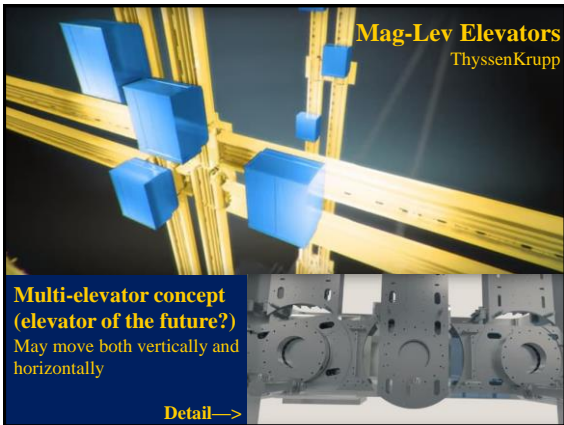
Aon Center
Chicago will soon be home to a new architectural ride for adrenaline junkies. Local firm Solomon Cordwell Buenz (SCB) recently released plans for a glass-walled elevator that will be fixed to the outside of the 46-year-old Aon Center in the Chicago Loop, transporting visitors 1,000 vertical feet in 60 seconds. Visitors can then take in a panoramic view of the city from the top of the 83-story tower. Construction will begin in 2019 with expected completion in 2021.

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Statue of Liberty
 Rescue elevator stops at 4
 levels including the crown.
 3-person capacity

40

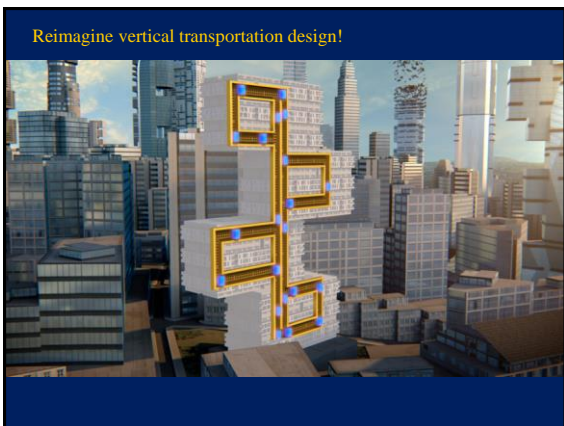


Mag-Lev Elevators
 ThyssenKrupp

Multi-elevator concept
(elevator of the future?)
 May move both vertically and
 horizontally

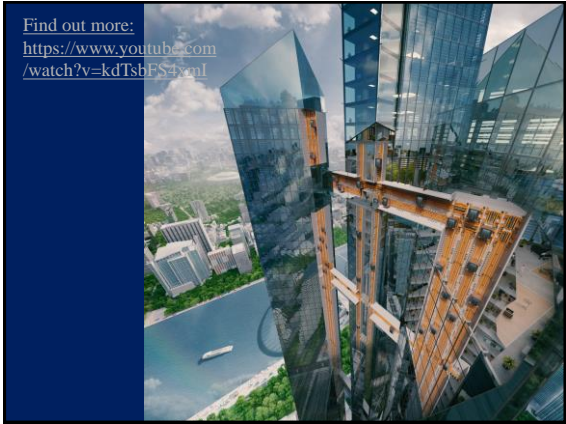
Detail—>

41

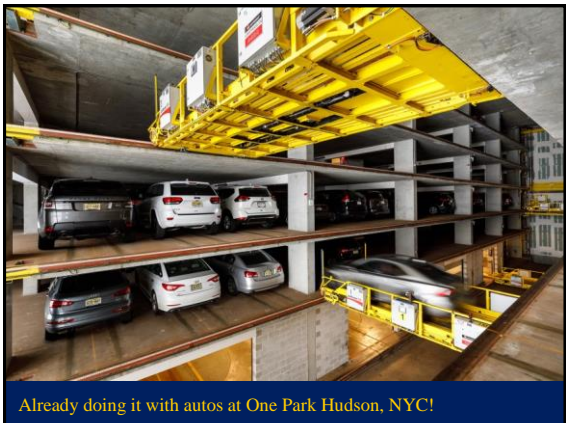


Reimagine vertical transportation design!

42



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45

Elevator Design Criteria

- Average waiting time (typ. 15-35 sec)
- Average travel time (waiting and going; typically 30-90 sec)
- Handling capacity (% of bldg. population in 5 min; typically 15%)

46

Design Issues

- Shaft space and location
- Lobbies and circulation
- Equipment space and penthouse
- Cost (direct and indirect)
- Smoke control and fire protection



47



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Palmer House Hotel – Chicago — 1920s decadence

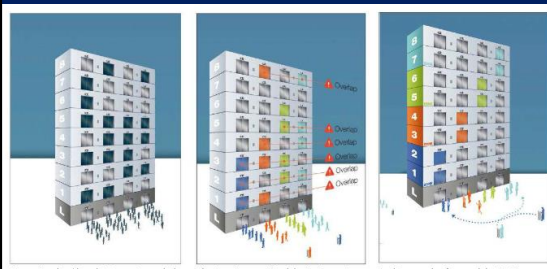
49

Elevator Performance Factors

- car capacity (size of car)
- number of cars
- car speed
- lobby design/location
- mix or separation of passengers/freight
- pattern of loads; coordination with other circulation elements
- control scheme
- zoning



50

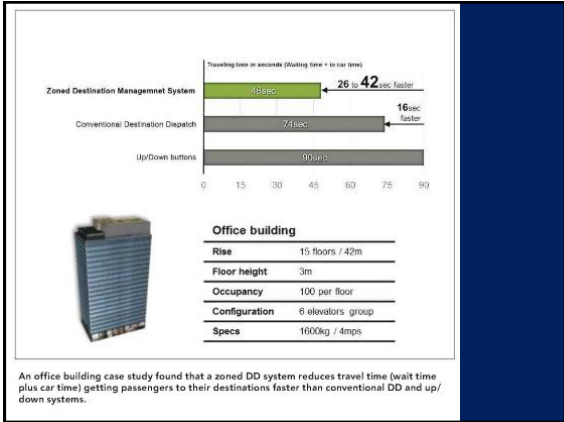


Conventional up/down button systems, which may have five stops per elevator.

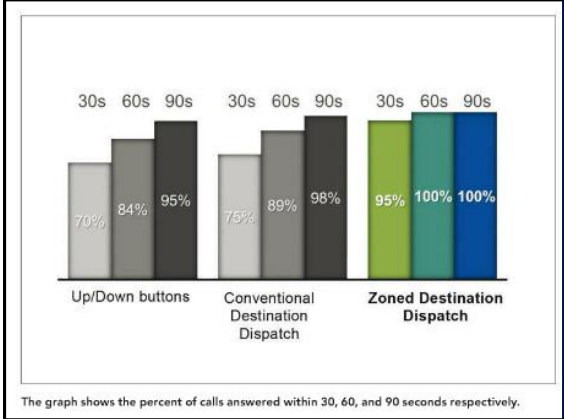
Elevators in conventional destination systems, which may have four stops per elevator, assign passengers with the same destination to the same elevator, but may overlap stops.

In this example of a zoned destination management system, floors are grouped into four contiguous sections. Travel is organized by both passengers' destinations and elevator stops.

51



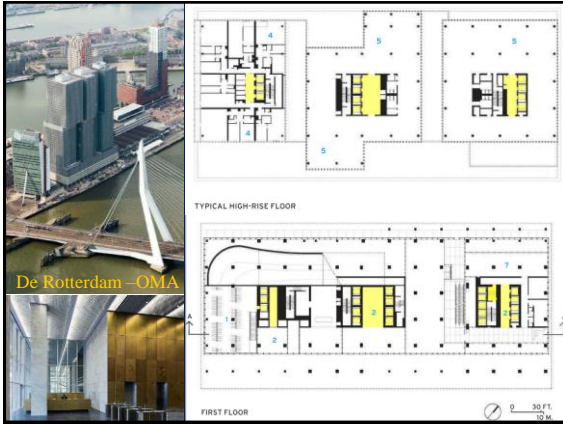
52



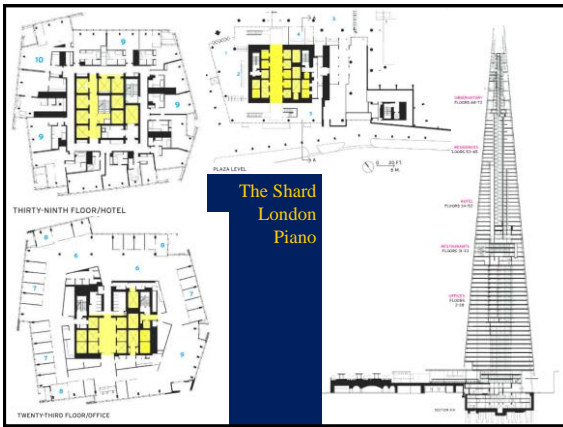
53



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56

Sizing and Drawing

Elevator selection (after determining *interval and average waiting time, handling capacity, travel time*):

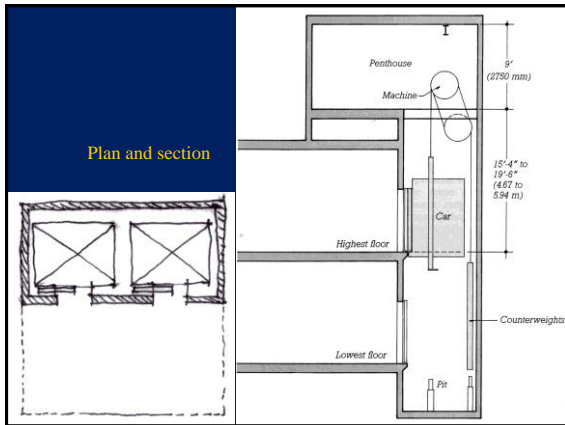
- *MEEB* section 32.39, dimensional data for pit, penthouse, shaft, and cars.
- *Architect's Studio Companion* v5, p. 201 for approx. number of shafts and capacity, sample elevator dimensions.

57

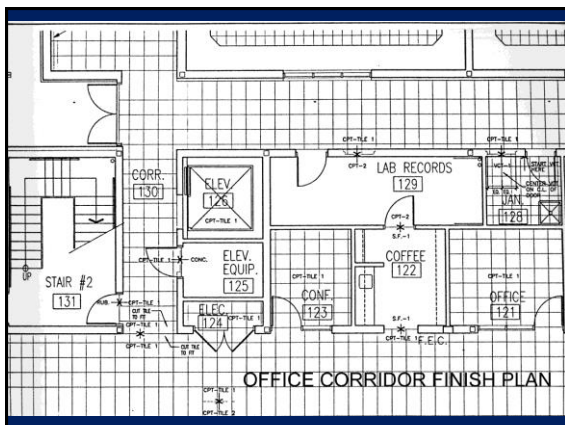
ELEVATOR DIMENSIONS			
Use	Capacity	Inside Car Dimensions	Inside Shaft Dimensions (width × depth)
Apartments,	2000 lb	5'-8" × 4'-3"	6'-7" × 7'-4"
Hotels, Office	(900 kg)	(1727 × 1295 mm)	(2006 × 2235 mm)
Buildings,	2500 lb	6'-8" × 4'-3"	8'-4" × 6'-8"
Stores	(1140 kg)	(2032 × 1295 mm)	(2540 × 2032 mm)
Office	3000 lb	6'-8" × 4'-9"	8'-4" × 7'-8"
Buildings, Hotels,	(1360 kg)	(2032 × 1448 mm)	(2540 × 2261 mm)
Stores			
Office	3500 lb	6'-8" × 5'-5"	8'-4" × 8'-1"
Buildings,	(1590 kg)	(2032 × 1651 mm)	(2540 × 2464 mm)
Stores			
Hospitals,	6000 lb	5'-9" × 10'-0"	8'-2" × 11'-9"
Nursing Homes	(2730 kg)	(1750 × 3050 mm)	(2490 × 3580 mm)
Freight,	4000 lb to 6000 lb	8'-4" × 10'-0"	10'-10" × 10'-8"
Service	(1820 kg to 2730 kg)	(2540 × 3050 mm)	(3300 × 3250 mm)

Architect's Studio Companion

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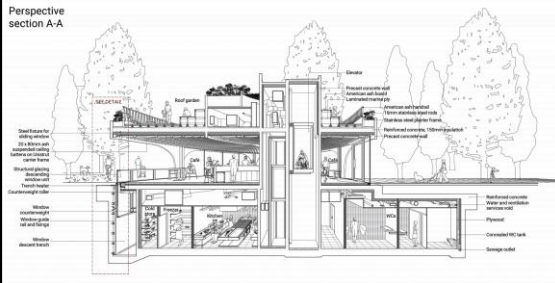
59



OFFICE CORRIDOR FINISH PLAN

60

What type of elevator is this?



Duke of York Café, London

61

Bottom line

- Show dimensionally correctly
- Celebrate, create an experience, don't hide!
- Work with a consulting engineer for specification, but stay in control of design.



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