

SUPER TALL

NICOLE DOSSO, FAIA



RWDI



The Port Authority of NY & NJ



The Port Authority of NY & NJ

Course Description:

This is a seminar on Super-Tall building typology. The class will follow an analytical approach by dissecting individual building components and their interrelationships to each other to build a comprehensive understanding of how Super-Tall Buildings behave.

From the early examples at the turn of the 20th Century in Chicago and New York onto today's global Super-Tall Towers, skyscrapers have been at the forefront of technological innovations in Architecture, Engineering and Construction Industries. It has led advancements in fields such as vertical transportation, structural systems, curtain-wall, wind tunnel engineering, environmental engineering, construction and fireproofing; and it has forced an ongoing discourse and evaluation of building codes.

What makes a Super-Tall building unique is its scale. However, scale cannot be read as an accumulation of numbers; a 100-story-tower is not a stack of 10-story-buildings added on top of each other. Even though, in its essence, a Super-Tall building can be seen as a multiplication of the site that it raises from, its behavior cannot be analyzed as an aggregation of its components. It presents complex, non-linear and dynamic behavior.

What are the building blocks of this unique typology? How do users circulate? How are such structures challenged by wind? What are the operational considerations and how are they maintained? How do we ensure the health, safety and welfare of occupants? How can we design and build smarter?

The exploration of the Super-Tall building typology will utilize New York City as a laboratory.

A case study will be provided to each student at the start of the semester, along with sample drawings and associated technical reports.

SUPER TALL

NICOLE DOSSO, FAIA

Students working in teams of two will be assigned one of the following categories:

- Vertical Transportation & Service
- Building Enclosure & Maintenance
- Building Systems: Structure & MEP
- Life Safety & Core Elements

The topics will be studied in various scales from overall building behavior to the details of building tectonics.

Throughout the semester, each team will develop a series of three-dimensional infographics that will visually represent the categorical fundamental building blocks of the Super-Tall.

Classes will incorporate presentations of the survey of assigned topics and the critique of their representations throughout the semester. New topic will be introduced for each category throughout the semester.

The course will also incorporate analysis of existing buildings as case studies, guest lecturers from experts on tall buildings and a field trip to a relevant building under construction.

Enrollment and Prerequisites:

Enrollment is limited to 12. Students must have completed AT4: Building Integration.

class 1 **course introduction**
case study: World Trade Center Tower 1
discussion topic: core analysis

| | | VERTICAL TRANSPORTATION & SERVICE | BUILDING ENCLOSURE & MAINTENANCE | BUILDING SYSTEMS: STRUCTURE & MEP | LIFE SAFETY & CORE ELEMENTS |
|----------|------------------|--|--|--|--|
| class 2 | discussion topic | performance - elevator report, size, group | assembly - building module, components, typical conditions | structural system - the deck, shear wall, typical framing | building code fundamentals - egress stair, photoluminescent |
| class 3 | discussion topic | elevator components - hoist way, divider beams, rails | interface - edge of slab, embeds, smoke seal | local fan room - tenant loop, smoke control | stair pressurization - smoke control |
| class 4 | | guest lecture - vertical transportation influencing the supertall | | | |
| class 5 | discussion topic | top and bottom - pit, overrun, elevator machine room | louvers - intake and exhaust | low and high rise mechanical plant - belt truss and distribution | fighting fire - siamese, standpipe, domestic and fire reserve tank |
| class 6 | discussion topic | cab fit-out - car operations, finishes, emergency access | the crown - coping, roofing and drainage | top of the house - cooling tower and dunnage | emergency generator - incoming service, operation, mtn. |
| class 7 | | mid review with guest critic | | | |
| | | no class student trip | | | |
| | | spring break | | | |
| class 8 | discussion topic | service cat - type, size, hoistway | building maintenance - track, rig, platform, glass replacement | providing power | lobby - system distribution, sequencing and finishes |
| class 9 | discussion topic | service cat - pit, overrun, elevator machine room | building maintenance - glass replacement | information technology | toilet room - plumbing and mechanical distribution |
| class 10 | | guest lecture - bim technology | | | |
| class 11 | discussion topic | loading dock - operational access | interior perimeter - convactor, column enclosure, shading device | foundations - caissons, incoming services, underslab drainage | security - turnstiles, bollards, cameras |
| class 12 | discussion topic | hoist complex | glass installation | construction sequencing - logistics, safeguard | protection from the elements - lightning and aviation |
| class 13 | | final review with guest critic | | | |

Note 1: Weekly discussion topic is student assignment for the week. Each class will begin with review of students interpretation of topic via infographic.

SUPER TALL

NICOLE DOSSO, FAIA

SITE VISIT TO MANHATTAN WEST NORTH EAST TOWER



GUEST LECTURE NEW HUDSON FACADE



GUEST LECTURE RWDI

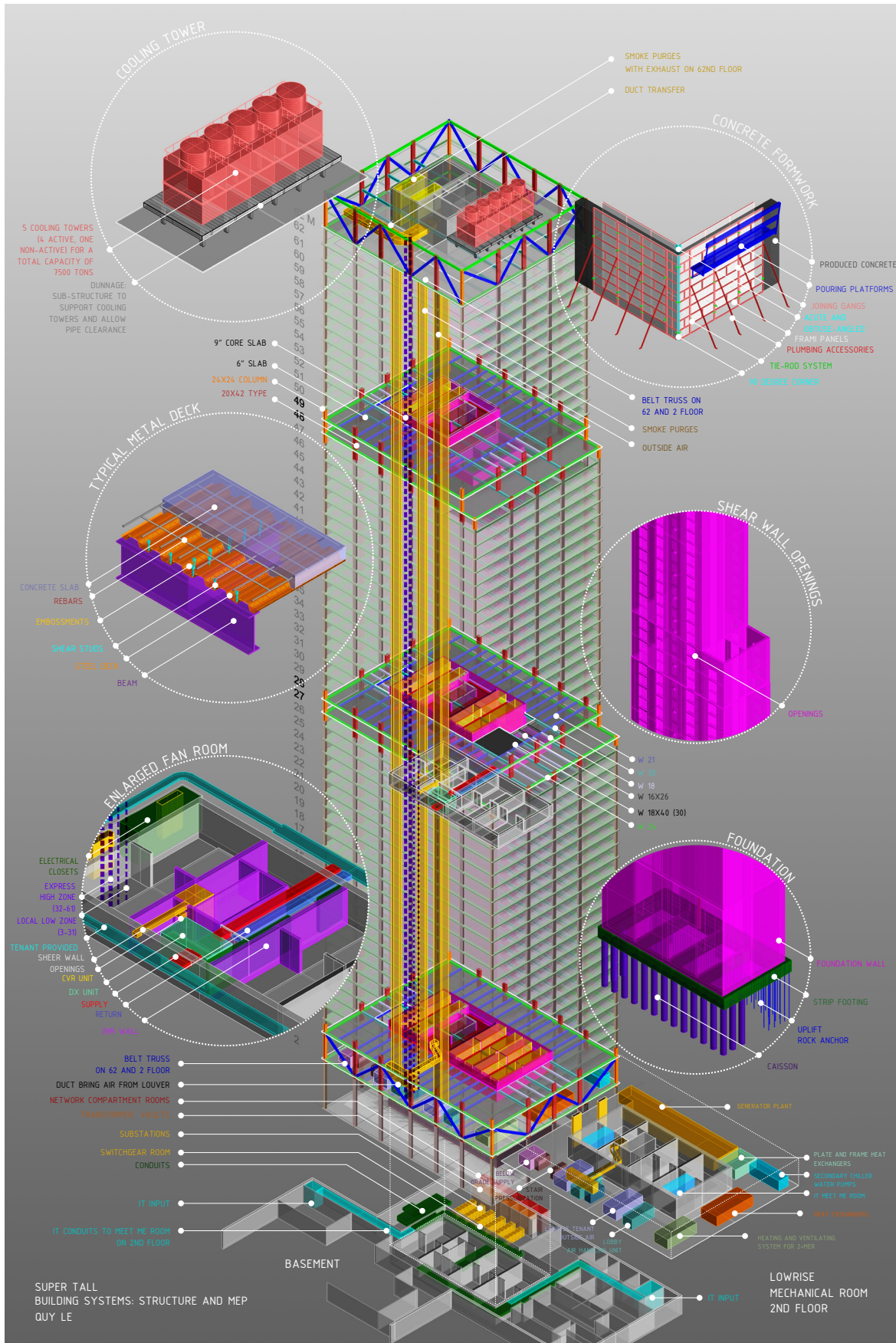


GUEST LECTURE EFFICIENCY LAB FOR ARCHITECTURE

STUDENT WORK SAMPLES
2018 SPRING SEMESTER

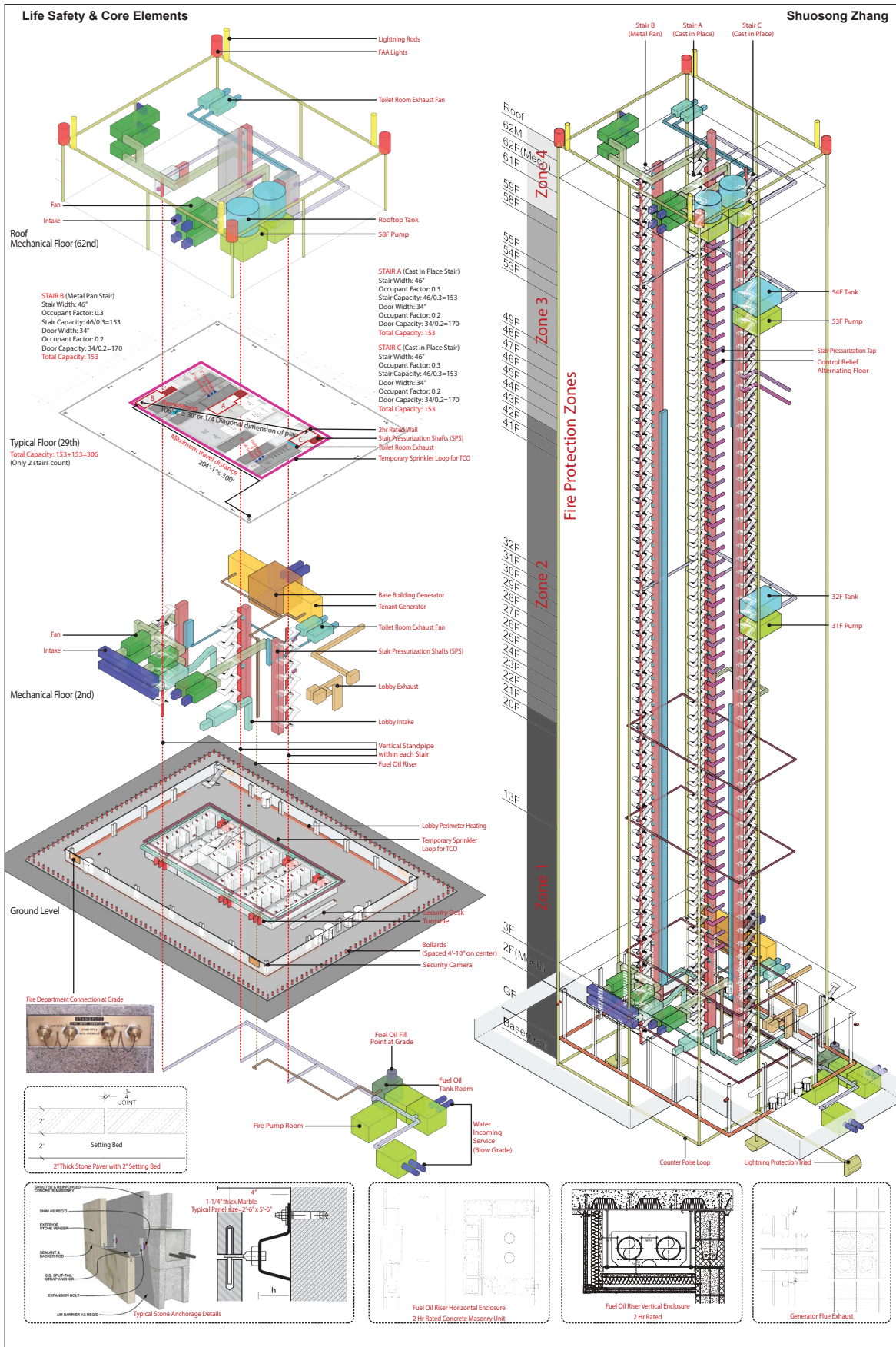
MEP & STRUCTURES

STUDENT NAME: QUY LE



LIFE SAFETY & CORE ELEMENTS

STUDENT NAME: SHUOSONG ZHANG



VERTICAL TRANSPORTATION & SERVICE

STUDENT NAME: ADEDE AMENYAH

PASSENGER CAR

6x Bank
3500 Pounds
1500 ft/min

PASSENGER CAR PLAN

VERTICAL TRANSPORTATION

708.14.1 Elevator Lobby. Except as provided by Sections 403.6.1 and 403.6.2, an enclosed elevator lobby shall be provided in high-rise buildings at the following locations: Elevators that serve four or more stories that contain space classified in occupancy Group B, enclosures of any lobby or entrance level, shall provide elevator lobbies at every level served by such elevator. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by smoke partitions. In addition to the requirements in Section 709 for fire partitions, doors providing openings in the elevator lobby enclosure walls shall also comply with Section 711.5.3 and precautions of the elevator lobby enclosure by ducts and air transfer openings shall be protected in accordance with Section 711.7.

TYPICAL BANK PLAN

ELEVATORS TO GRADE

ELEVATOR CORE PLAN

SMOKE PROOF LOBBY

SERVICE CAR

3x Bank
6000 Pounds
1000 ft/min

SERVICE CAR PLAN

NYC ZONING - LOADING DOCK REQUIREMENTS

ACCESSORY OFF-STREET LOADING BERTHS (28-36-42)
 Bath required for office use: 1 bath
 Floor: 100,000 sq ft: 0 berths
 Floor: 200,000 sq ft: 1 berth
 Floor: 300,000 sq ft: 2 berths
 Total: (1,649,120) - 300,000(3) = 1,049,120 sq ft: 6 berths for project

NYC ZONING - BICYCLE PARKING
REQUIRED BICYCLE PARKING SPACES (28-36-71)
 Spaces required for retail use:
 1 per 750 sq ft of floor area: 220 spaces (281,221,000 sq ft)
 1 per 1,000 sq ft of floor area: 3 spaces (300,000 sq ft)
 Provided: 224 bike racks (complies)

REQUIRED BICYCLE STORAGE (28-36-73)
 15 sq ft Bicycles (24\"/>

CRANE & HOIST COMPLEX

INTERIOR HOIST COMPLEX

INTERIOR CRANE

EXTERIOR HOIST COMPLEX

HOIST CAR SECTION

FRONT VIEW OF HOIST CAR

CRANE IN ELEVATION

ELEVATOR DETAILS

Elevator Car Requirements. Elevator cars shall comply with Section 407.4.

407.4.1. Inside dimensions of elevator cars shall comply with Table 407.4.1.

| TYPE OF ELEVATOR | MINIMUM CLEARANCE | MINIMUM WIDTH | MINIMUM DEPTH |
|------------------|-------------------|---------------|---------------|
| Passenger | 68" | 48" | 54" |
| Service | 72" | 54" | 60" |

3002.2.2 Elevator car to accommodate ambulance elevator. Where elevators are provided in buildings five stories or higher in fire or other occupancy buildings as indicated in Section 405.1, at least one elevator subject to Section 3002.2.3 shall be provided with an elevator car of such a size and arrangement to accommodate an ambulance stretcher 24\"/>

3007.6.1. General. Where required by Section 403.6.1, every floor of the building shall be served by a fire service access elevator complying with Sections 3007.1 through 3007.8. 3007.6.5. A pictorial symbol of a standard design indicating which elevators are fire service access elevators shall be installed on each side of the hoistway door frame on the portion of the frame at right angles to the fire service access elevator lobby.

3007.6. Fire service access elevator lobby. The fire service access elevator shall open into a fire service access elevator lobby in accordance with Sections 3007.6.1 through 3007.8.6. Egress is permitted through the elevator lobby in accordance with Section 708.14.

3007.7. Elevator system monitoring. The fire service access elevator shall be continuously monitored at the fire command center by a standard emergency service interface system meeting the requirements of NFPA 72.

CAR FINISHES

PASSENGER CAR: GLASS WALL PANELS

SERVICE CAR: ALUMINIUM DIAMOND PLATE

COUNTERWEIGHT GUIDERAILS

JAMB INDICATOR

CALL STATION TYPICAL FLOOR

CALL STATION LOBBY

COUNTERWEIGHT BUFFERS

ELEVATOR HOISTWAY SECTION

MACHINE ROOM

OVERRUN

HOISTWAY

PASSENGER ELEVATOR HOISTWAY SECTION

ELEVATOR PIT

PASSENGER ELEVATOR HOISTWAY SECTION

SERVICE ELEVATOR HOISTWAY SECTION

PARTIAL SERVICE PLATFORM

HALL LANTERN
BRILLE PLATE

JAMB DETAIL

HEAD DETAIL

SILL DETAIL

PASSENGER CAR DETAILS

CONTROL BUTTON IDENTIFICATION

CALL STATION

BUILDING ENCLOSURE & MAINTENANCE

STUDENT NAME: SHUO YANG

