

Massachusetts College of Art and Design Tower Building Assessment

Commonwealth of Massachusetts
Division of Capital Asset Management and Maintenance

14 November 2013

ARUP

Introduction to Arup Team

Arup: Prime Consultant and MEP Engineers

- Project Director – Mark Walsh-Cooke
- Project Manager, Plumbing and Fire Protection – Jim Nadeau
- Mechanical – Michael Hovanec
- Electrical – Jack Aroush
- Sustainability – Rebecca Hatchadorian

Gensler: Architect

- Principal – Ken Fisher

RSE Associates: Structural Engineers

- Principal – Richmond So

VJ Associates: Cost Consultant

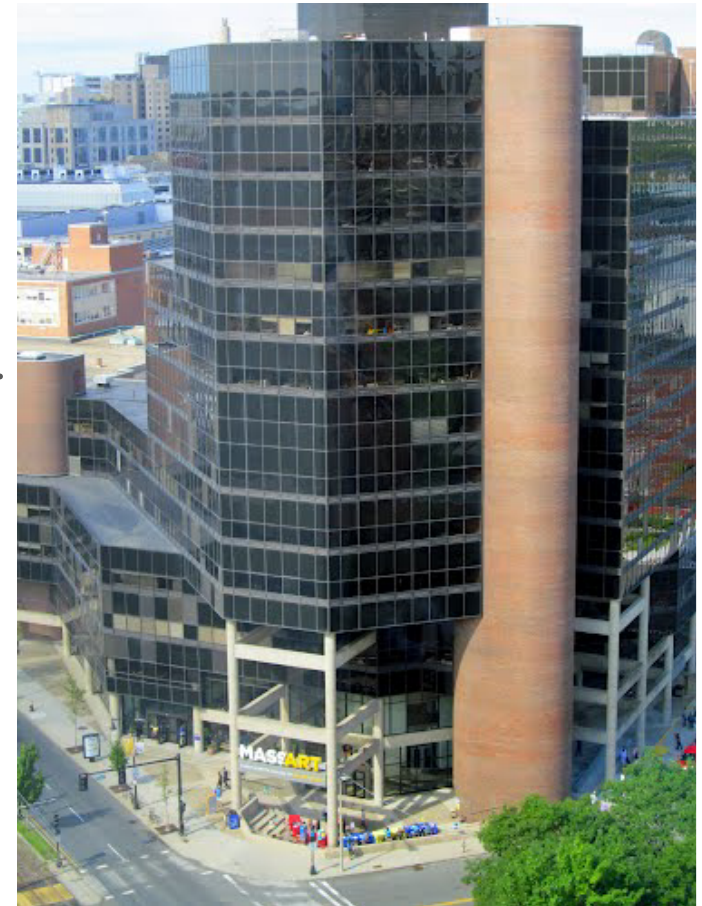
- Director – Clive Tysoe

Norton Remmer Consulting Engineers: Code Consultant

- Principal – Norton Remmer

MCAD Tower Building Overview

- Located at 621 Huntington Ave. in Boston
- 14 stories tall and ~ 318,300 GSF
- Original construction documents dated May 1972 but identified as built in 1977
- Major renovation and upgrade completed in 1999.
- The Tower houses an auditorium, classrooms, offices, lecture halls, galleries and studio spaces
- Holds 60% of MCAD's classrooms, 22 of 37.
- 2013 CAMIS value \$98,127,074.00



Assessment Process

1. Existing Conditions Assessment

- Site observation tour and desk study
- Identify key deficiencies to systems, façade, code and space planning

2. Mandatory Interim Scope

- Scope of work to keep the building operational prior to rehabilitation
- Addresses life safety and immediate operation issues

3. Building Rehabilitation Options

- Options for the Tower to address all identified deficiencies

Existing Conditions Assessment

Issues Identified

- Façade
 - Very poor thermal performance
 - Very poor condition
 - Leaks air and water
 - Repair work (defective)
- Architectural
 - Roofs in poor condition,
 - Fireproofing/firestopping is inconsistent
 - Waterproofing failure in basement
 - Inefficient layout
 - Toilets fixture counts do not meet code
 - Elevators are inefficient
- Mechanical systems
 - Perimeter systems not working & hard to repair
 - 13 AHUs past useful life (CAV system)
 - Life span nearing end & Natural gas chiller
 - BMS limited capabilities
- Accessibility, per IHCD report
- Code
 - Handrails in Stair Enclosure
 - Path of egress
- Electrical systems
 - Main switchgear lacks redundancy
 - Secondary distribution poor condition
 - Emergency system has no emergency/standby/optional capabilities
 - Lighting systems original & no control systems
- Plumbing systems
 - DHW temperatures
 - Pipework original and failing
- Fire Protection
 - No Stair/Elevator Pressurization in high rise
 - No smoke control systems
 - Fire Pump
 - Alarm devices not connected to sprinklers
 - Hose valve connections outside rated enclosure
 - Sprinkler coverage inadequate in areas
 - Fire alarm system antiquated
 - No Fire Command Center
 - Fire alarm panel is at/exceeded capacity
- Hazardous Materials
 - Asbestos and potential PCBs

Mandatory Interim Scope

A major rehabilitation of a building such as the Tower takes time to be funded, studied, certified, designed, and constructed. However, to ensure the building can continue to operate and be occupied, critical infrastructure must be replaced or repaired to keep the building running in the interim.

The mandatory interim scope has three components;

- The ***required*** scope addresses risks to life safety, and/or immediate operations.
- The ***recommended*** scope includes upgrades which are important but are not completely critical to ensure continued operation before a major project can be done.
- The ***triggered upgrades*** scope addresses code issues, such as accessibility and path of egress issues that may potentially be required depending on the actual scope and schedule of work undertaken.

These scopes of work are separate from typical deferred maintenance

Mandatory Interim Scope

Required Scope			
	Scope Item	Priority	Estimated Construction Cost* (ECC)
3.3.1	Main Switchgear Replacement	Immediate Operations + Life Safety	1,875,900.00
3.3.2	Egress Stair Pressurization	Life Safety	354,900.00
3.3.3	Freight Elevator Pressurization	Life Safety	89,570.00
3.3.4	Hose Valve Connections	Life Safety	33,800.00
3.3.5.a	Fire Alarm Devices	Life Safety	13,520.00 ¹
3.3.5.b	Fire Alarm System Replacement	Immediate Operations + Life Safety	980,000.00 ¹
3.3.6	Fire Pump Replacement	Immediate Operations + Life Safety	67,600.00
3.3.7	Domestic Hot Water Heater	General Safety	12,675.00
3.3.8	Refrigerant Leak Detection System	Life Safety	123,370.00
3.3.9	Open Railings in Multi-Story Space	Life Safety	50,700.00
3.3.10	Structural Beam Repair	Safety Concern	59,150.00
3.3.11	Detail Fireproofing Survey	Potential Life Safety	25,350.00
TOTAL			3,673,015.00¹
Recommended Scope			
	Scope Item	Priority	Estimated Construction Cost* (ECC)
3.4.1	Occupancy Sensors	Energy Performance	109,850.00
3.4.2	Solar Control Window Film	Energy Performance	202,800.00
TOTAL			312,650.00
Triggered Upgrades			
	Scope Item	Priority	Estimated Construction Cost* (ECC)
3.5.1	Accessibility Upgrades	Code - Accessibility	-
3.5.2	Accessible Entry at Huntington Ave	Code - Accessibility	-
3.5.3	Path of Egress	Code - Life Safety	-

*Estimated Construction Cost numbers noted are order of magnitude only. They include all mark-ups (totaling 64%) and assume normal working hours.

¹ The total cost noted does not include costs for connecting the fire alarm devices (3.3.5.a) as a full system replacement (3.3.5.b) would address this item.

Building Rehabilitation Options

To address all the issues identified,

• Façade	Replace
• Roofs	Replace
• Mechanical systems	Replace
• Electrical Systems (excluding switchgear)	Replace
• Lighting	Replace
• Plumbing Systems	Replace
• Fire Protection Systems	Replace
• Structural Systems	Keep

Accessibility upgrades would be triggered

- 2013 CAMIS Value = \$98,127,074
- 30% Threshold = \$29,438,123

Seismic upgrades may or may not be triggered
Abatement would be required

Building Rehabilitation Options

Given the lengthy list of deficiencies identified in the Tower and costs to rectify them, while also improving the building's layout efficiency, energy performance and system reliability, our conclusion is that a significant intervention is required.

Option 1: Retain Primary Structure and Complete Renovation

- Unoccupied Renovation
- Horizontal Phasing, floor by floor
- Vertical Phasing, split the building in two

Option 2: Demolish and Rebuild

- Rebuild 318,299 GSF, the existing Tower gross square footage.
Additional 16,521 net square feet due to space planning efficiency gains.
- Rebuild 290,763 GSF, the existing Tower net square footage
27,536 less gross square feet due to space planning efficiency gains.

Building Rehabilitation Options

The order of magnitude total ECC ranged from \$140,210,393 to \$154,358,842 with an estimated project construction duration ranging from 24 to 33 months.

	Net Area (NSF)	Gross Area (GSF)	Efficiency ³ (%)	\$/GSF	ECC ²
Option 1: Retain Primary Structure and Complete Renovation					
Unoccupied renovation	174,458	318,299 ¹	54.8	\$461.80	\$146,991,007
Horizontal phasing	174,458	318,299 ¹	54.8	\$494.37	\$154,358,842
Vertical phasing	174,458	318,299 ¹	54.8	\$482.27	\$153,506,294
Option 2: Demolish and Rebuild					
Rebuild 318,299 GSF	190,979	318,299 ¹	60.0	\$479.90	\$152,750,287
Rebuild 290,763 GSF	174,458	290,763	60.0	\$482.21	\$140,210,393

¹ Areas noted have been provided by MCAD, and represent adjusted gross square footage (AGSF).

² The costs noted are 2013 dollars.

³ Efficiency is the % of net square footage to total gross square footage