



The University
of Vermont

Votey Hall

Re-Engineering Votey Hall:

Investment of Deferred Maintenance \$\$ into an aged Engineering Building

by: Lynn Wood
Retro-Commissioning Engineer
Physical Plant Department



The University of Vermont

Votey Hall

New Construction:

- STEM **\$104M**
- Central Campus Residence Hall **\$70M**
 - Bailey Howe Bridge
- Kalkin- Ifshin Hall **\$11M**
- Billings **\$8.5M**

Deferred Maintenance:

- Votey Hall 1962 to 2017 **\$5M**



The University of Vermont

Votey Hall

Importance of Deferred Maintenance \$\$:

Deferred maintenance

Deferred maintenance is the practice of postponing maintenance activities such as repairs on both real property (i.e. infrastructure) and personal property (i.e. machinery) in order to save costs, meet budget funding levels, or realign available budget monies. The failure to perform needed repairs could lead to asset deterioration and ultimately asset impairment.

- 50% of Buildings that are over 50 years old
- 214 out of 243 Buildings are over 30 years old
- Mechanical and Electrical Equipment typically has a 15-20 year life cycle
- Roofs last 20-30 years Warranty for 20 years
- Code and Safety require upgrades
- Technology is constantly changing
- Utility costs continue to increase so it is important to upgrade to more efficient energy users
- Older equipment is expensive to maintain



The University
of Vermont

Votey Hall

Deferred Maintenance:

Votey Hall Approximately \$5 M in Deferred Maintenance

- Boilers for Fleming Museum
- Roof
- Life Safety Systems
- Electrical Switchgear
- Main Electrical Distribution
- Generator
- Telecom Infrastructure Replacement
- AHU-1 Dual Duct
- Dual Duct VAV Boxes
- Controls



The University of Vermont

Votey Hall

Collaborative Effort:

- FD&C Responsible for Overall Project Costs \$10M for Renovations of Labs – part of the STEM Initiative
- Boilers for Fleming Museum –PPD Ray Doner and team
- Fire Alarm and Electrical Improvements strongly advised by Mike Enos
- AHU-1 Dual Duct & Dual Duct VAV Boxes –Davis Zone Contributions
- Controls
- Dedicated team from FD&C and PPD for Design Review
- Construction Team



The University
of Vermont

Votey Hall

Construction Schedule:

Jan - May 21 – 3pm-11pm shift for rough-in and electrical

May 21 - DeEnergized Votey, Building Vacated for construction

August 1 - Energized Votey!

August 15 - Certificate of Occupancy!!

~3 months

to complete \$10M in Deferred Maintenance and Renovations



The University of Vermont

Votey Hall

Deferred Maintenance:

Votey Hall Approximately \$5 M in Deferred Maintenance

- Boilers for Fleming Museum
- Life Safety Systems
- Electrical Switchgear
- Main Electrical Distribution
- Telecom Infrastructure Replacement
- Generator
- AHU-1 Dual Duct
- Dual Duct VAV Boxes
- Controls



The University of Vermont

Votey Hall

Boiler Replacement:

- 2 new Boilers for Fleming Museum located in Votey
- Provides redundancy with Central Plant for reheat and dehumidification

“houses Vermont's most comprehensive collection of art and anthropological artifacts. It presents innovative exhibitions of contemporary and historic art from around the world”





The University
of Vermont

Votey Hall

Deferred Maintenance:

Votey Hall Approximately \$5 M in Deferred Maintenance

- Boilers for Fleming
- Life Safety Systems
- Electrical Switchgear
- Main Electrical Distribution
- Telecom Infrastructure Replacement
- Generator
- AHU-1 Dual Duct
- Dual Duct VAV Boxes
- Controls



The University of Vermont

Votey Hall

Life Safety Systems:

- Code compliance with new sprinkler system
- Fire Alarm System, Device and Wiring Upgrade





The University
of Vermont

Votey Hall

Deferred Maintenance:

Votey Hall Approximately \$5 M in Deferred Maintenance

- Boilers for Fleming
- Life Safety Systems
- Electrical Switchgear
- Main Electrical Distribution
- Generator
- Telecom Infrastructure Replacement
- AHU-1 Dual Duct
- Dual Duct VAV Boxes
- Controls



The University of Vermont

Votey Hall

Electrical Switchgear, Main Electrical Distribution, Generator:

- Before the Electrical Upgrade there was no safe PPE to wear to work on electrical equipment





WARNING
High Voltage
Electrical Shock Hazard

E-T-N
PLC

Technical specifications and safety information for the PLC unit.

WARNING
High Voltage
Electrical Shock Hazard

WARNING
High Voltage
Electrical Shock Hazard

E-T-N
PLC

WARNING
High Voltage
Electrical Shock Hazard

Network switch ports labeled 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

E-T-N

WARNING
High Voltage
Electrical Shock Hazard

WARNING
High Voltage
Electrical Shock Hazard

WARNING
High Voltage
Electrical Shock Hazard

WARNING
High Voltage
Electrical Shock Hazard




EAT-N | **Cutler-Hammer**

Heavy Duty Safety Switch
Interrupteur de sécurité à usage intensif
Interruptor de seguridad de servicio pesado

100 A, 240 V~, 60 Hz, 250 V ---

Complete Ratings Inside. Further Instructions Inside.
 Valeurs nominales complètes à l'intérieur. Autres instructions à l'intérieur.
 Información completa de capacidades en el interior. Instrucciones adicionales en el interior.



⚠ DANGER

HAZARDOUS VOLTAGE. WILL CAUSE SEVERE INJURY OR DEATH.

- Never operate switch with cover open.
- Turn OFF power ahead of switch before doing any work inside. Replace all parts. Close cover before turning power ON.

TENSION DANGEREUSE. PEUT CAUSER DES BLESSURES GRAVES OU LA MORT.


- Ne jamais manœuvrer l'intercepteur lorsque la couverture est ouverte.
- Couper l'alimentation en amont de l'intercepteur avant toute intervention. Remplacer les pièces. Fermer la couverture avant de remettre sous tension.

⚠ PELIGRO

VOLTAJE PELIGROSO. PUEDE CAUSAR HERIDAS SEVERAS O LA MUERTE.


- Nunca opere el interruptor con la cubierta abierta.
- Desconectar la alimentación del interruptor antes de trabajar dentro del mismo. Reemplazar todas las partes. Cerrar la cubierta antes de energizar el interruptor.

ON



OFF

Made in U.S.A. / Fabriqué aux É.-U. / Hecho en E.U.A. 30-43075-2



WARNING

Arc Flash and Shock Hazard
Appropriate PPE Required

Hazard Category 0		PPE Required	
Arc Flash Protection		• Nonmelting or Untreated Fiber with Weight >= 4.5 oz/sq yd	
1 in Flash Boundary		• Safety Glasses or Goggles + Ear Canal Inserts	
0.01 cal/cm² Incident Energy		• Leather Gloves	
@ 18 in		• N/A	
Shock Protection		Contact: UVM SOS (Physical Plant)	
480 VAC Shock Hazard		Telephone: 656-2560 ("24/7" Coverage)	
42 in Limited Approach		Date: January 2013	
12 in Restricted Approach		EQUI 016692	
1 in Prohibited Approach			

Equipment: **T-LP220 DISC**



OLYMPIAN

5291
750



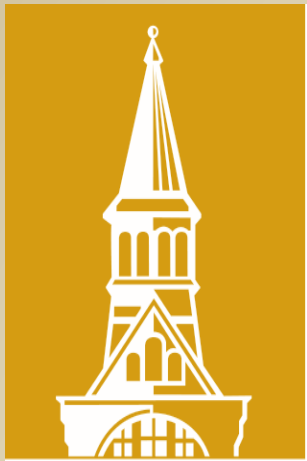
The University
of Vermont

Votey Hall

Deferred Maintenance:

Votey Hall Approximately \$5 M in Deferred Maintenance

- Boilers for Fleming
- Life Safety Systems
- Electrical Switchgear
- Main Electrical Distribution
- Generator
- **Telecom Infrastructure Replacement**
 - AHU-1 Dual Duct
 - Dual Duct VAV Boxes
 - Controls

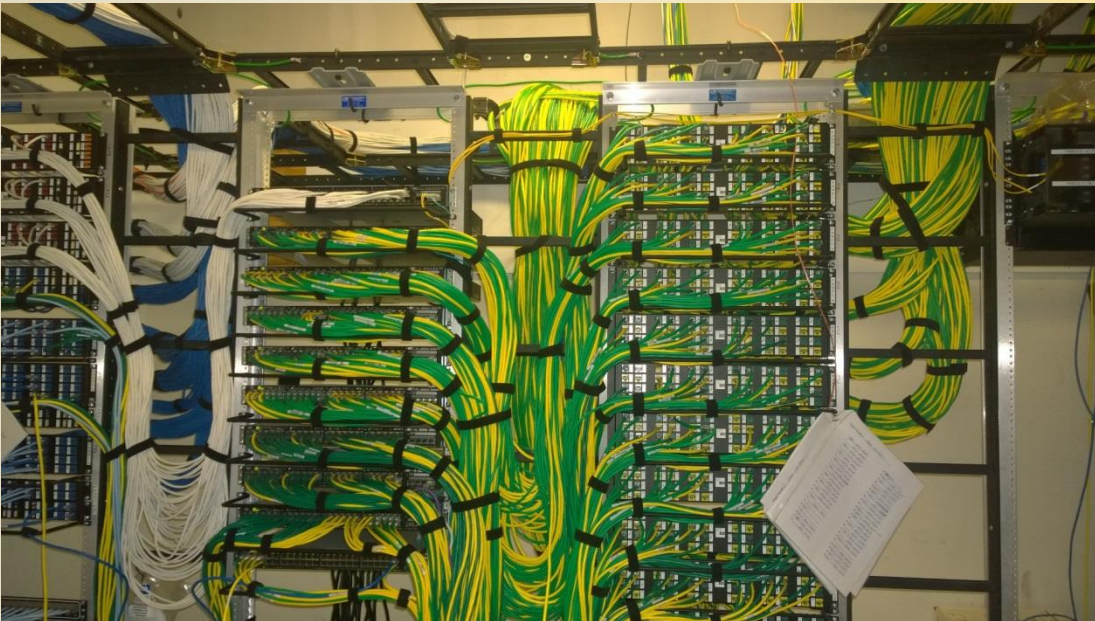


The University of Vermont

Votey Hall

Telecom:

- Total removal of existing network infrastructure rebuilt
- Pulled over 200,000 feet of new network cable





The University
of Vermont

Votey Hall

Deferred Maintenance:

Votey Hall Approximately \$5 M in Deferred Maintenance

- Boilers for Fleming
- Life Safety Systems
- Electrical Switchgear
- Main Electrical Distribution
- Generator
- Telecom Infrastructure Replacement
- AHU-1 Dual Duct
- Dual Duct VAV Boxes
- Controls



The University
of Vermont

Votey Hall

Dual Duct AHU-1

New Chilled Water
and Steam Coils





The University
of Vermont

Votey Hall

Dual Duct AHU-1

**New Motors,
Electrical Feeds,
Sheaves, Bearings**





The University
of Vermont

Votey Hall

Dual Duct AHU-1

Epoxy Coating on Floors and
condensate pans





The University
of Vermont

Votey Hall

Dual Duct AHU-1

New Dampers and
Filter Banks





The University of Vermont

Votey Hall

Controls:

And some works of art left for historic purposes ... the old pneumatic panel that we decided to keep for its value as an artifact – at least in CEMS eyes :)

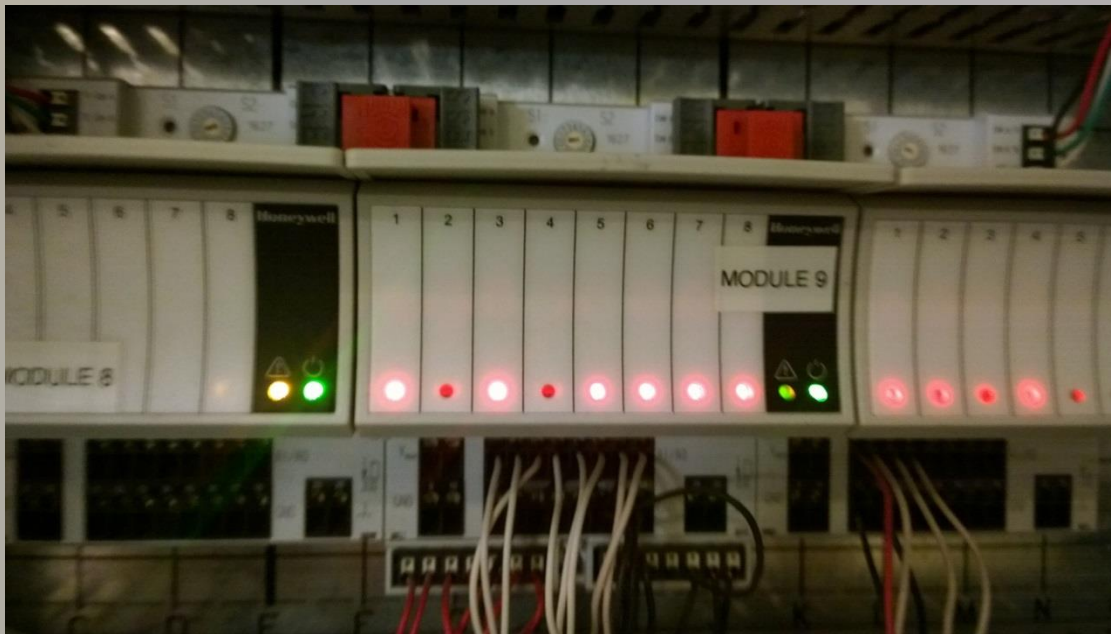




The University of Vermont

Votey Hall

Controls: Upgraded to a new control panel for Dual Duct AHU-1, including over 30 Dual Duct VAV boxes, EF-1 thru 8 VFD interface

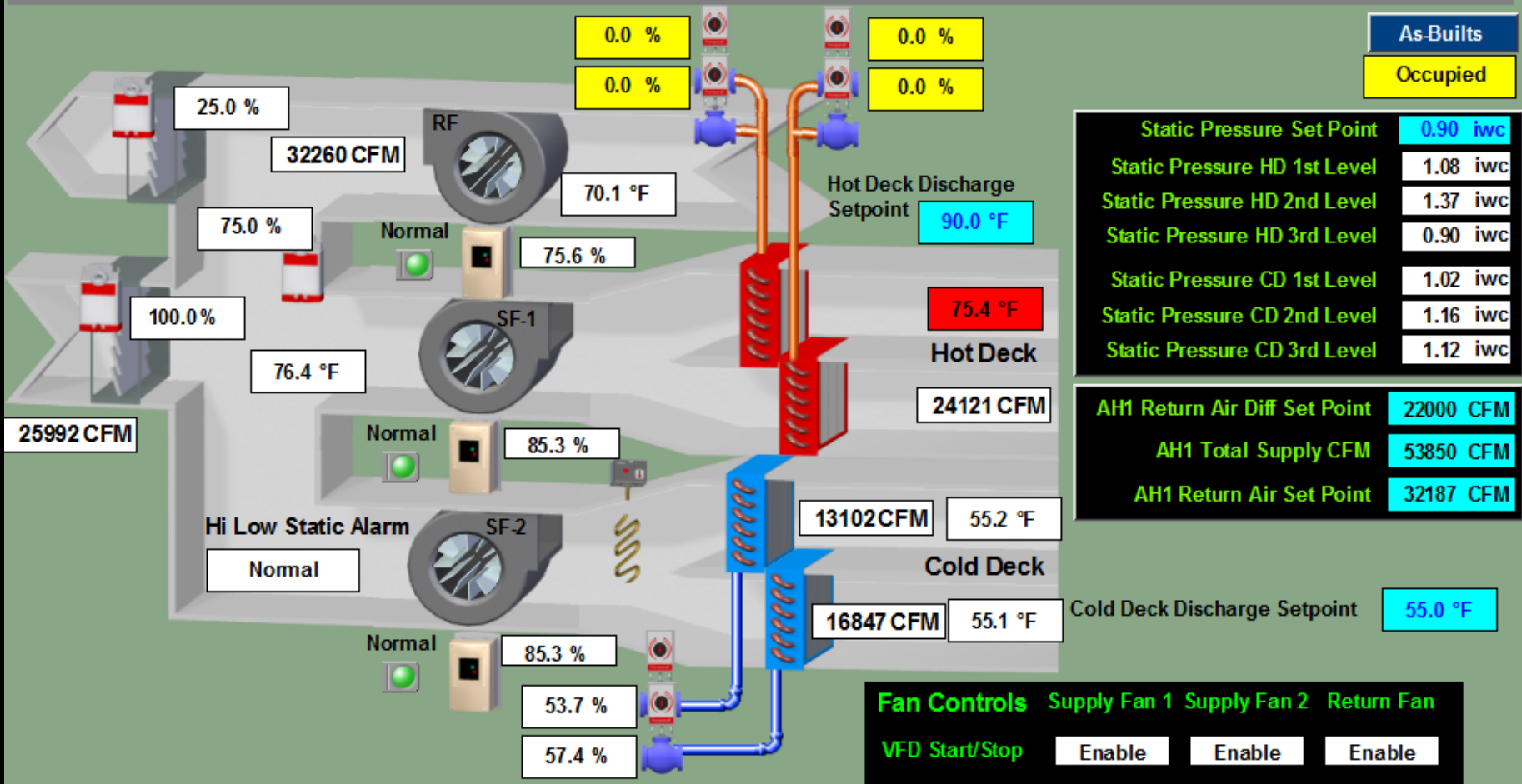




THE UNIVERSITY
OF VERMONT

Welcome to Votey Hall Dual Duct System

OAT 76.8 °F





Soils Lab 123



Hydraulics Lab 101



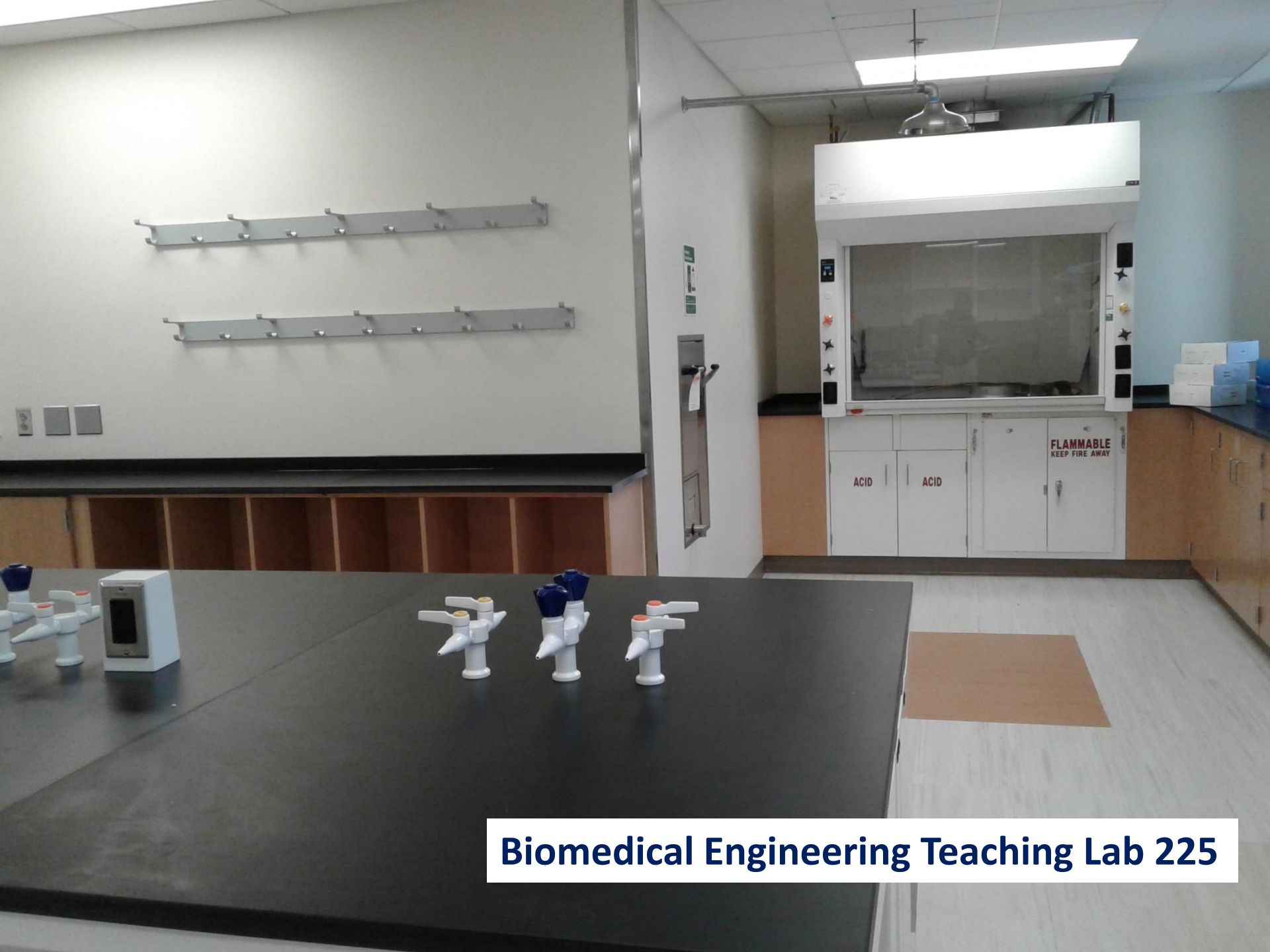
Shop 122



Shop 122



Materials Teaching Lab 248



Biomedical Engineering Teaching Lab 225



Entrance First Floor

The logo of the University of Vermont, featuring a white silhouette of a Gothic-style building with a tall spire, set against a solid orange background.

The University of Vermont

Votey Hall

Bridge to STEM:

Votey is now connected to STEM—our latest addition to College of Engineering Math and Science (CEMS)... providing impressive experiences for our learners.



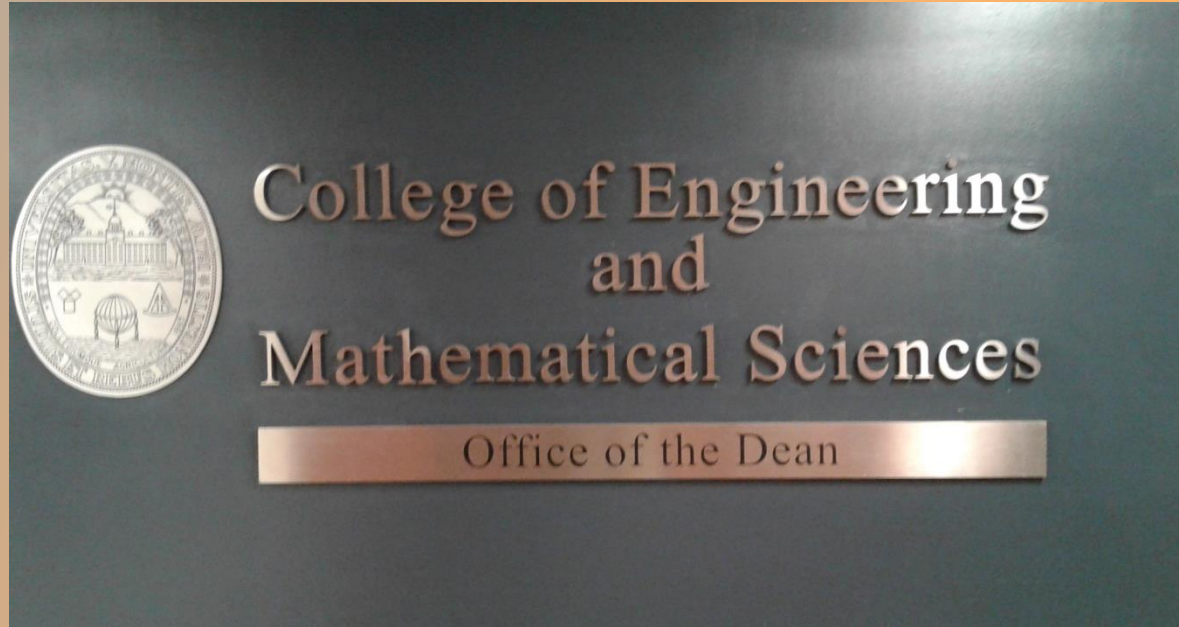
“The University of Vermont's largest-ever capital project will bring a state-of-the-art STEM (science, technology, engineering and mathematics) complex of laboratories, classrooms and research facilities to campus and prepare our students for careers in rewarding, high-growth fields.”



The University of Vermont

Votey Hall

And that is how our Engineering Building was Re-Engineered



The University of Vermont

Votey Hall

REMEMBERING SPECIAL TIMES AT COOK: Sometimes there just isn't enough Deferred Maintenance \$\$'s to bring a building back

THE END

