
The University of Waterloo Fire Research Facility

Institute for the Advancement of Fire Safety

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Mechanical Engineering
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Motivation

- Cost of fire can be reduced through
 - advancements in detection, suppression and fire fighting methods
 - development of innovative equipment
 - design of fire-safe products
- Difficulty accessing appropriate test facilities



The UW Fire Research Facility

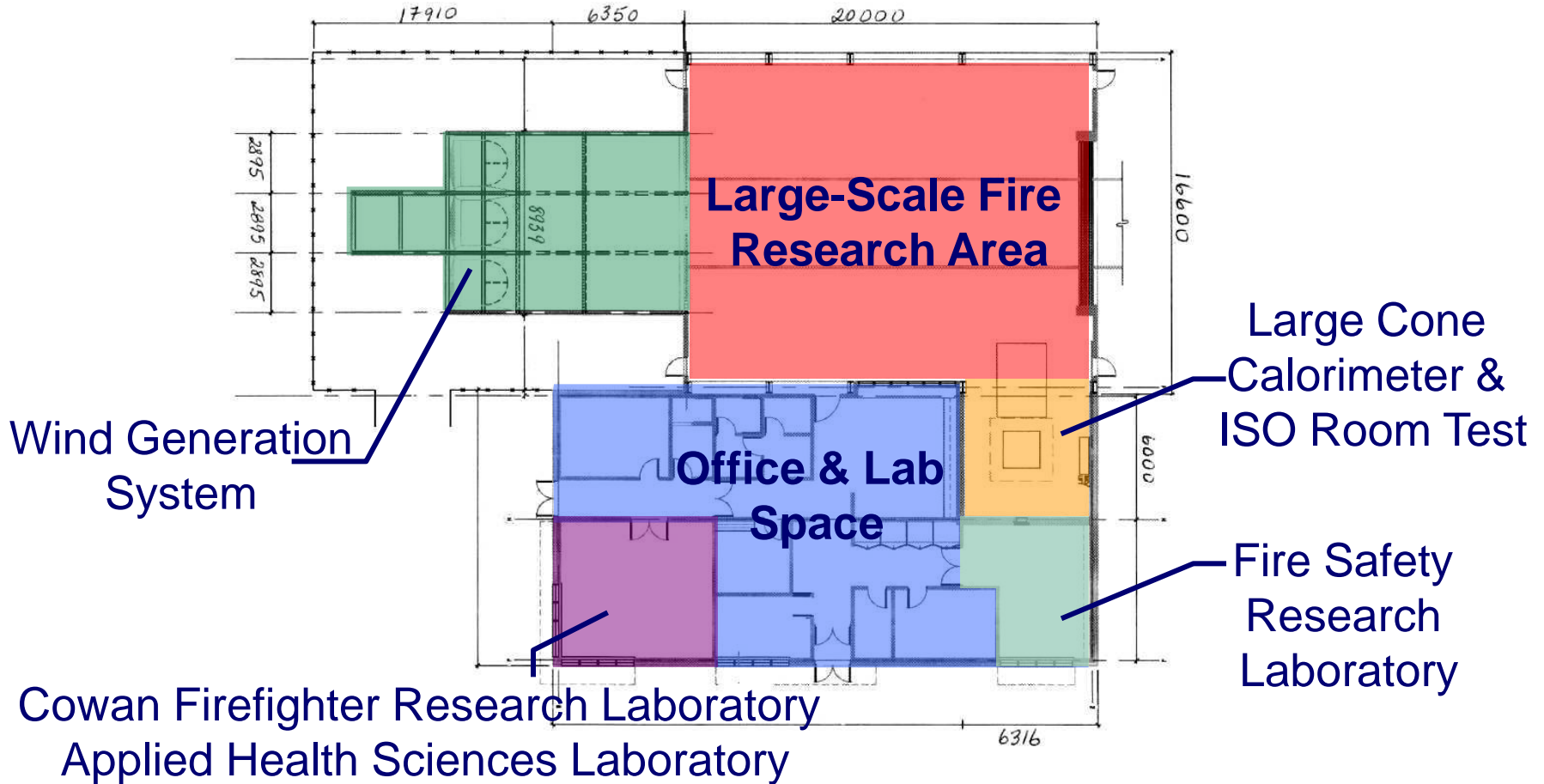


- \$5.6 million Live Fire Research Facility
- Integral part of larger ES training & research complex



- Funding partners:
 - Region of Waterloo
 - City of Kitchener
 - Federal & Provincial Governments
 - Industry

Infrastructure at the Facility

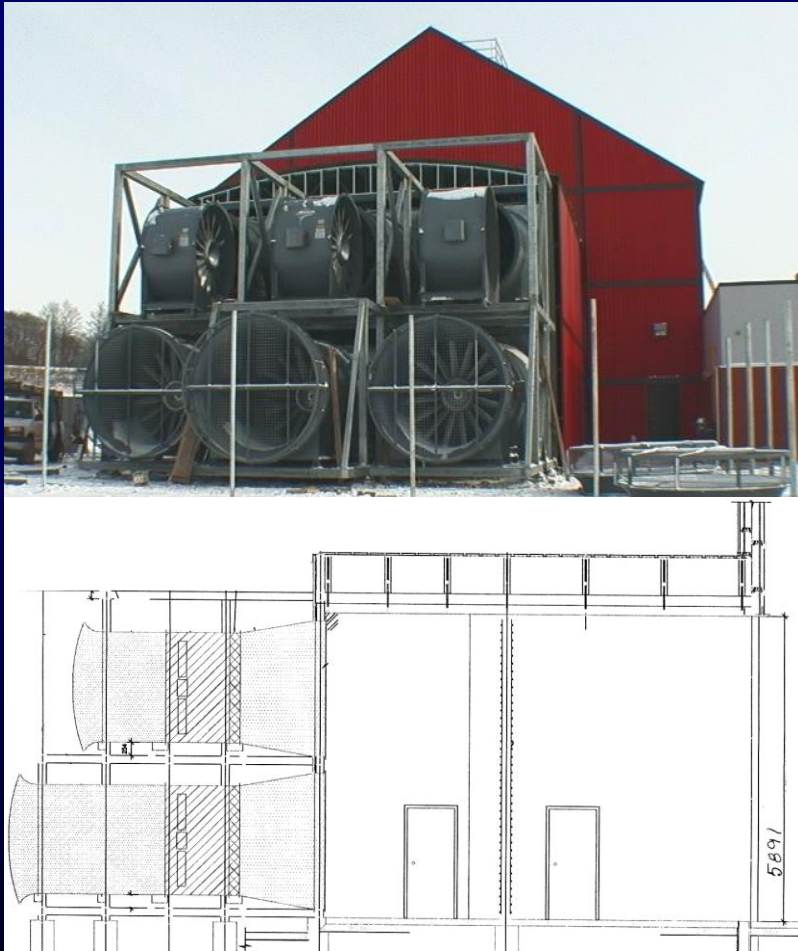


Large-Scale Fire Research Enclosure



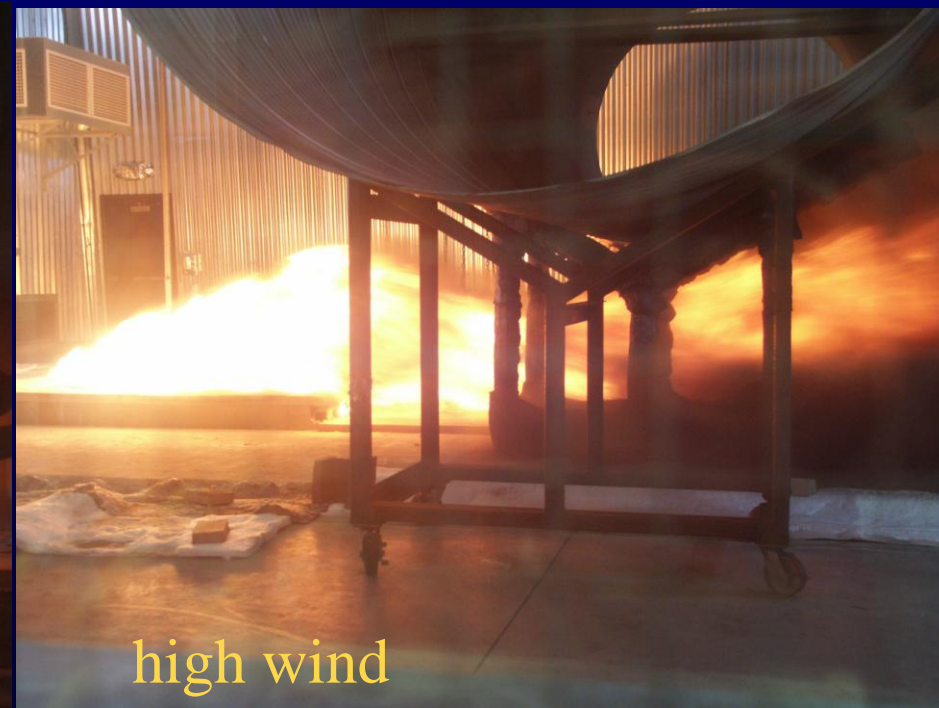
- Test enclosure:
 - 3,975 ft², 4+ storeys
- Accommodates
 - two storey burn house
 - large fire experiments

Wind Generation System



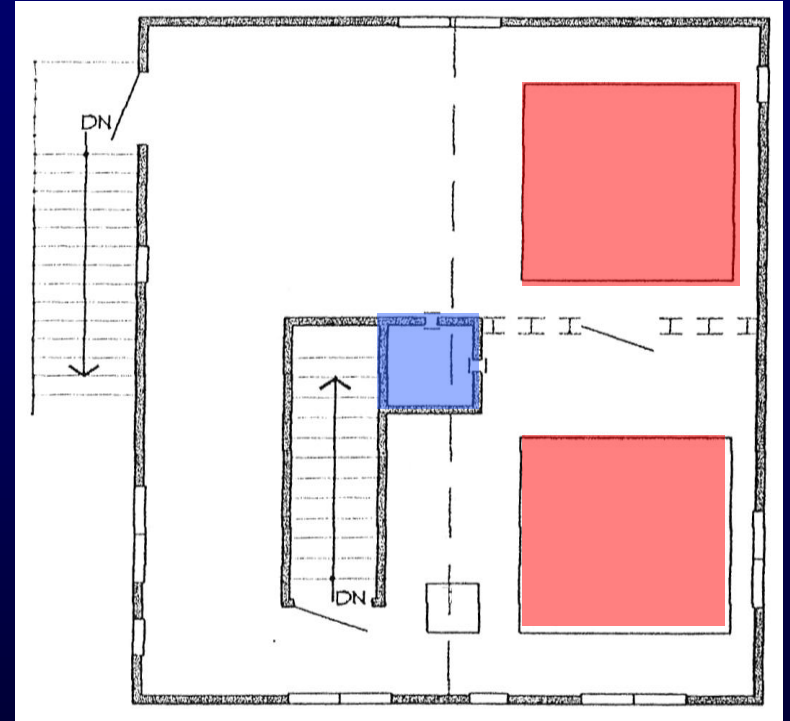
- Six 72" fans with plenum
- Flow straightening system
- Crosswinds:
 - up to ~ 12 m/s
 - 20 ft x 26 ft outlet into test enclosure

The Test Enclosure



2 m diameter Jet A fire in crosswind with mock fuselage

The Burn Building



Movable; Flexible configuration; Central instrumentation well

Small Scale Testing Lab

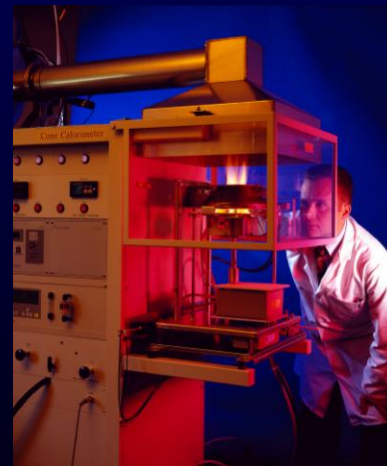
- Lab Tests:
 - Cone Calorimetry
 - NBS Smoke Test
 - Flame Spread
 - Oxygen Index
- Composite and standard material samples



Smoke Density Chamber



IMO/LIFT apparatus



Small-Scale Cone Calorimeter

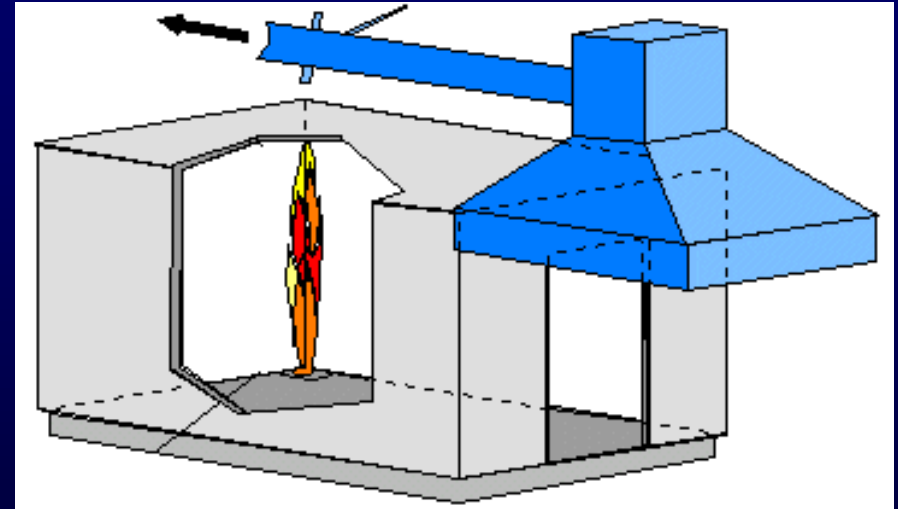


Oxygen Index

Cone Calorimeter & ISO Test Room



Large Cone Calorimeter
2MW fire test area



ISO 9705 Room Fire Test

Cowan Firefighter Research Laboratory

- Firefighter Fitness
- Ergonomics of Equipment
- Incidence of Lower Back Injuries
- Firefighter Fitness Testing



Research Efforts

- Fundamental and applied research with application to fire professionals, industry & public fire safety
 - Fire initiation, spread, heat release, materials
 - Generation of smoke/heat
 - Fire safe design
 - Equipment/methodologies
 - Health issues



Transportation Accident Simulations



Compartment Fire Testing

Future Direction

Educational initiatives in conjunction with research

- Short-courses, seminars and workshops for fire safety professionals
 - exchange and dissemination of research results
- Preliminary curricula for University programs in Fire Safety Engineering, professional development
 - international model curriculum
 - Ontario Fire Marshal's Office, practicing engineers, and various Fire Protection Engineering programs