The University of Waterloo Fire Research Facility
Institute for the Advancement of Fire Safety

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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 Area
- Wind Generation System
- Office & Lab Space
- Large Cone Calorimeter & ISO Room Test
- Cowan Firefighter Research Laboratory
- Applied Health Sciences Laboratory
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

low wind

high wind
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

Images of testing equipment:
- Smoke Density Chamber
- IMO/LIFT apparatus
- Oxygen Index
- Small-Scale Cone Calorimeter
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