



# Workers' Report

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## Critical Injuries: Forward Avenue Fire

Ottawa Fire Services  
Incident # 07-8038      February 12, 2007



Photo courtesy of Jean Lalonde

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## Dedication

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In the early afternoon of February 12<sup>th</sup>, 2007, the members of No. 11 Station, D Platoon, were called to 187 Forward Avenue for a report of fire. Within 9 minutes of their arrival on scene, five members of 11 D would be fighting for their lives in the performance of their duties. This Report is dedicated to ensuring that the injuries and suffering incurred by these five members and that the lessons learned were not in vain.



Photos courtesy of Ottawa Fire Services



## Acknowledgements

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The officers and firefighters in attendance at this fire have assisted greatly in the generation of this Report and to them we offer our heart felt thanks for sharing, caring and for showing tremendous courage in the face of adversity.

The Ottawa Fire Service provided time off from regularly scheduled duties for Workers' Representatives to conduct interviews and fulfill their obligations in accordance with the Occupational Health and Safety Act.

The Ottawa Professional Fire Fighters Association, in keeping with the philosophy of shared "Internal Responsibility", provided for paid replacements for Workers' Representatives in the preparation of this Report.

The reporting process began with the participation and stewardship of former worker Co-Chair Scott Grakist and committee member Mike Vervoort who together established a foundation for this Report through their representation and actions.

The Report investigative team wish to express their gratitude to all those who contributed to this Report through their cooperation, encouragement, guidance and patience.





# Executive Summary

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This Report has been developed in response to the critical injuries sustained by five firefighters during the Forward Avenue fire event of February 12<sup>th</sup> 2007.

At 12:28 Hours on February 12<sup>th</sup>, 2007 Pump 11A, Pump 11B, Ladder 11 and Car 10 were dispatched to 187 Forward Avenue for a report of fire. The weather was sunny and clear with a temperature of -14.5°C. The wind was from the North West at 20 kilometres an hour with gusts up to 26 kilometres per hour. This combined for a wind chill of -24°C.

Upon arrival crews were faced with heavy fire in the building of origin, a 4-storey occupied multiple dwelling. There was a male occupant at a third floor window on Side 1 and a report of additional trapped occupant. Fire was extending at the rear towards three exposures; all 4-storey occupied multiple dwellings.

Within 28 minutes this incident had escalated to a 5<sup>th</sup> Alarm bringing eighty-six (86) firefighters on twenty-five (25) pieces of apparatus to the scene as well as four (4) Operations Chiefs and five (5) Staff Chiefs.

During this 28-minute period one civilian was rescued over Ladder 11's power-operated aerial ladder. Three (3) firefighters conducting an interior search for additional occupants were forced to jump from a fourth floor window on Side 4 of the original fire building resulting in critical injuries to all. Two (2) other firefighter's lives were also placed in jeopardy after searching for a reported occupant when forced to jump out of a fourth floor window and falling two storeys onto a porch roof on Side 1. In addition three of the exposure buildings were searched and evacuated and fire fighting operations commenced in two separate buildings.

To further underline the intensity of this incident the Command Benchmark of "Loss Stopped" was not transmitted until 15:50 Hours.

The Ottawa Professional Fire Fighters Association's ("OPFFA") worker group representatives of the Joint Occupational Health & Safety Committee ("JOHSC") evaluated the fire and the actions taken by worker members and non-worker members along with the conditions on scene to identify and determine the following:

- Actions that may have contributed, directly or indirectly to the five critical injuries
- Identify immediate, basic and root causes to prevent future occurrences
- Compliance with existing policies, standard operating procedures, training and practices
- Adequacy of existing policies, standard operating procedures, training and practices
- The impact of the event on the workers, their families, and their social well-being.
- Industry best practices

This Report represents our findings and recommendations to the JOHSC and notice to the Ministry Of Labour.



# Recommendations

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## Investigative Process

It is recommended that:

- OFS and the OPFFA through the JOHSC establish specific terms of reference for the investigation and reporting of LODD(s), critical injuries and near misses.
- OFS provides health and safety representatives with training in critical injury / fatality / near miss investigation.
- OFS establish written procedures detailing the requirements for scene preservation and documentation in the event of a critical injury / fatality / near miss.
- OFS establish a sealed investigations toolbox for use by designated representatives containing basic equipment for scene preservation and documentation and locate the toolbox on Safety Car 23 and a spare within the Safety Office for multiple incidents.
- OFS establish a procedure for sharing investigative reports within and outside OFS.
- Section 21 Health and Safety Advisory Committee establish a Guidance Note detailing requirements for investigation and reporting of LODD(s), critical injuries and near misses.
- MOL employ a member of the Ontario Provincial Fire Fighters Association as a policy advisor or specialist to investigate fire related complaints, serious injuries and LODD(s).

## Building Construction

It is recommended that:

- The Corporation of the City of Ottawa (“the Corporation”), OFS and OPFFA advocate for provincial and national building and fire code requirements that limit the growth and spread of fire.
- The Corporation evaluate the Forward Avenue building complex and through that evaluation incorporate fire safe design within future Ottawa Community Housing Projects.
- Ottawa Community Housing retrofits fire resistive cladding or installs unvented eaves in the area where Building 1 and Building 4 are not spatially separated.
- The Corporation direct Building Services to inspect Ottawa Community Housing building stock for any similarly configured spatial separations and undertakes corrective actions where warranted.
- OFS establish and define descriptive building terminology for use within operations and that the terms are incorporated into tactical manuals.
- OFS update and deliver a comprehensive Building Construction - Strategic and Tactical Considerations course.

## Strategy and Tactics

It is recommended that:

- OFS re-evaluate response models for hi-risk structures
- OFS update the existing tactical manuals and develop, implement and maintain a series of tactical guidance manuals specific to type, occupancy and construction of buildings encountered within Ottawa.
- OFS develop, implement and maintain a strategic and tactical considerations curriculum directed at firefighter, officer and chief officer development that encompasses knowledge (theory), skills (application) and abilities (evaluation) in its design.

- OFS establish a Tactical Ventilation Program.
- OFS incorporate decision-making theory for both discretionary and non-discretionary actions within the development and delivery of strategic and tactical curriculum.
- OFS establish an operational research and development program within the Training Division. This program is to be directed at evaluating, developing, implementing and communicating educational, technical and operational solutions for tactical needs.
- OFS develop strategic and tactical guidance for operations during wind driven fire conditions.
- OFS establish a Strategies and Tactics Committee comprised of Suppression, Training and Safety division members for the timely development and dissemination of the above-recommended actions.
- OFS adopt the requirements of NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments within the urban boundaries of the city.
- OFS adopt NFPA 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments within the rural boundaries of the city.

### **Rapid Intervention Teams / Self Rescue System**

It is recommended that:

- OFS purchase and deploy a hose key and ladder strap for each riding position.
- OFS research, purchase and deploy a self-rescue system for all operational personnel.

### **Fire Behaviour**

It is recommended that:

- OFS develop, implement and maintain a comprehensive fire dynamics course for all operational personnel.
- OFS contract with a forensic engineering firm or Fire Protection Engineering graduate students to develop a Fire Dynamics Simulation (“FDS”) of the Forward Avenue fire and report on the critical factors in the initiation, growth and spread of this fire.<sup>1</sup>
- OFS integrate the Forward Avenue fire FDS into the fire dynamics course to develop and enhance operational assessment skills and evolve consensus strategic and tactical approaches based on identified critical factors within the FDS.
- OFS instructors undertake Level I and Level II Compartment Fire Behaviour Training (“CFBT”) in order to deliver it within the department.

### **Training**

It is recommended that:

- OFS properly staff and resource the Training Division to develop, implement and maintain training programs in all the emergency disciplines.
- OFS engage subject matter experts in all phases of program development wherever possible.
- OFS ensure a Workers Health and Safety Representative is included in the make-up of the Urban Training Consultation Committee.

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<sup>1</sup> National Institute of Standards and Technology (“NIST”) has developed a FDS fire modelling program and the results can be viewed as 3-dimensional animations that can show differences in fire behaviour based on changes in such things as wind or ventilation openings.

- OFS develop, implement and maintain curriculum directed at firefighter, officer and chief officer development that encompasses knowledge (theory), skills (application) and abilities (evaluation) in its design.
- OFS companies be evaluated quarterly on their abilities to perform a series of standard functions as defined by the relevant SOPs.
- OFS conduct multi-company exercises on a quarterly basis.
- OFS conduct annual multi-company, multi-discipline city wide exercises
- OFS undertake a feasibility study for the construction of a new purpose built, all season, multi-discipline training facility.
- OFS integrates Level I and Level II Compartment Fire Behaviour Training (“CFBT”) within structural firefighting operational training
- OFS immediately discontinue the practice of delivering abridged versions of training courses.
- OFS undertake a comprehensive review of all current fire suppression training materials and courses to establish their efficacy with respect to procedural context and operational realities.
- OFS Training Officers be afforded opportunities to return to operational roles to evaluate efficacy and relevance of training programs as part of a quality control process.
- OFS develop, implement and maintain a searchable electronic training library and repository of technical knowledge.

## **Communications**

It is recommended that:

- OFS establish a minimum staffing level of six personnel at all times in the Communications Centre.
- OFS explore the ability to add and modify fields within the existing CAD system in support of descriptive building terminology, pre-incident plans and premise history.
- OFS adopt a radio communications model predicated on a combination of citywide response channels and dedicated tactical fireground channels.
- OFS provide a portable radio to all personnel operating at emergency incidents.
- OFS reinforce standard radio terminology usage with all users.
- OFS establish written operational procedures for the roles and responsibilities of OFS personnel in the response and management of a distress (“MAYDAY”) call.
- OFS confirm the provenance and security of the PANDA data-logging computer.
- OFS ensure end users, prior to adoption and implementation, comprehensively test command aids.
- OFS ensure command aids are supported in their implementation by training and field audits.
- OFS develop, implement and maintain a pre-incident planning program.
- OFS ensure a Workers Health and Safety Representative is included in the make-up of the Communications Committee.
- FMT ensure that the Communications Committee act in a timely manner with respect to recommendations and decision-making.

## **Incident Management System**

It is recommended that:

- OFS develop, implement and maintain standardized incident management training for all users of the system.
- OFS Training Division be directed to include the concepts of Crew Resource Management as promulgated by the International Association of Fire Chiefs in the development of any incident management training program.
- OFS develop, implement and maintain the position of Command Aide.
- OFS establish preceptorship training for command officers through the Command Aide position.
- OFS develop, implement and maintain Incident Management Teams for use at large scale incidents or civic emergencies.
- OFS integrate the incident management system in all company, multi-company and city-wide training exercises.

## **Ladder 11 – Fleet and Operational Issues**

It is recommended that:

- Fleet Services ensure that all personnel evaluating or performing work on OFS response apparatus be Certified Emergency Vehicle Technicians.
- Fleet Services ensure that any personnel evaluating or performing work on OFS response apparatus are trained to do so by the vehicle manufacturer.
- OFS, Fleet Technical Services and Financial Services Unit establish an Ottawa Fire Services Standard (“OFSS”) for specification of firefighting apparatus.
- Corporate Health and Safety develop an ergonomic review of proposed specifications and that ergonomic principles be included in any developed OFSS.
- OFS ensure that all apparatus placed into commission has an operator’s manual issued to the assigned station and that an additional copy is maintained on the apparatus and forms part of the vehicle inventory.<sup>2</sup>
- OFS ensure that all personnel operating fire fighting apparatus are trained in the use, tactical deployment and maintenance of said apparatus.
- OFS conduct a needs analysis with respect to apparatus type and allocation.
- OFS ensure that all power operated elevating devices with ground ladders have as a minimum complement: 1 – 50’ Bangor, 2 – 35’ Extensions, 1 – 20’ Roof, 1 – 14’ Roof, 1 – Attic, and 1 – multi-purpose collapsible ladder.
- OFS staff all OFS ladder companies with five personnel.
- Fleet Services establish written procedures for all phases of apparatus acceptance testing (new or refurbished), training, commissioning and annual testing.
- OFS augment the initial dispatch to a reported structure fire with an additional pump and ladder company for firefighting.
- OFS, Fleet Technical Services and Financial Services Unit establish a vehicle and equipment committee with a mandate for the design, specification, acceptance and commissioning of response and support vehicles.
- OFS ensure committee representation includes users and a Workers Health and Safety Representative.

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<sup>2</sup> This is an example of documentation that should be in an electronic library/technical knowledge repository as per Training Recommendations

## **Post Incident Analysis (PIA)**

It is recommended that:

- Post incident analysis (“tail-boarding”) become a mandatory process at all incidents and that a formal PIA be held for 3<sup>rd</sup> Alarm fires and above, at any significant incident or when requested by chief officers.
- OFS ensures that the on-duty Safety Officer(s), Supervisor and Supervising Dispatcher for an incident requiring a formal PIA will be required to attend.
- A General Order reflecting these recommendations be developed and instituted detailing the requirements for a PIA.
- Copies of Safety Division “Report on Fire” reports be circulated to the Fire Management Team, JOHSC and within all Divisions.
- OFS establish a budget line item for reports on incidents to support the costs of investigation, report writing, reproduction and dissemination within the department.
- The practice of removing on-duty Safety Officers from operational duties and directing them toward off-site investigative duties should be discontinued, especially at major incidents.
- A General Order be developed identifying the roles and responsibilities of OFS personnel and allied agencies as they relate to the investigation of PPE, equipment, apparatus and scene conditions material to an event.

## **Injuries**

It is recommended that:

- OFS WSIB Injury Reports are reviewed for causal factors and addressed through recommendations from the JOHSC.
- OFS in cooperation with the Corporate Health & Safety, ensure that all OFS personnel receive awareness training for psychosocial hazards and their potential effects (psychosocial injuries) within the workplace.
- OFS develop, implement, and maintain a Line of Duty Injury Survivor (“LODIS”) Protocol that deals with the emotional needs, physical, and mental health of all affected personnel and addresses contingencies for family members.
- OFS assign the LODIS Protocol development, implementation and maintenance to the Protocol Officer and members of the Ottawa Fire Critical Incident Response Team (“OFCRT”).
- OFS establish a committee to review health and wellness within the workplace.





# Introduction

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## **Legislative Investigative Authority and Obligation**

The development of this Report and the authority to report its findings is legislated under Occupational Health and Safety Act of Ontario R.S.O. 1990 (“The Act”). Sections 8, 9, and 10 of The Act grants powers of investigation and places reporting obligations on the Ottawa Professional Fire Fighters Association (“OPFFA”) as the Workers’ Representatives.

Specifically:

Worker members appointed to the Joint Occupational Health and Safety Committee (“JOHSC”) must designate one or more worker members to investigate any incident in which a person is killed or critically injured [Section 9 (31)].

The committee members or representative has the right to inspect the place where the incident occurred as well as any relevant machine, device or thing. Following the investigation, all findings must be reported [Sections 8(14) and 9(31)].

The committee or representatives have the power to evaluate the situation and recommend actions to prevent a similar incident in the future [Section 10].

The following Workers’ Representatives were involved with the Critical Injuries investigation and report:

### ***Team Members:***

Peter MCBRIDE, Joint Occupational Health & Safety Committee,  
Lead, Designated Investigative Representative – Certified member  
Incident Safety Officer (ISO), Safety Division, Ottawa Fire Service

Gerald LANG, Joint Occupational Health & Safety Committee,  
Designated Investigative Representative – Certified member  
Firefighter, Suppression Division, Ottawa Fire Service

Stephen MCFARLANE, Co-Chair Joint Occupational Health & Safety Committee  
Certified member  
District Chief, Suppression Division, Ottawa Fire Service

Raymond BALCOM, Joint Occupational Health & Safety Committee  
Certified member  
Captain, Suppression Division, Ottawa Fire Service

Brandon HOGAN, Joint Occupational Health & Safety Committee  
Firefighter, Suppression Division, Ottawa Fire Service



# Investigation

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The worker group representatives of the JOHSC undertook the development of this Report to ensure that worker concerns were addressed and represented to both the JOHSC and the Ministry of Labour in their reviews of the incident.

## Purpose

The purpose of an accident or incident investigation is to discover the underlying causes in order to prevent future incidents from occurring. It is not for laying blame. It is fact-finding not fault-finding.

The goal of an incident investigation is to determine what happened, why it happened, and what can be done to prevent future injuries, or possibly deaths within OFS and throughout the fire service. The goal of this Report is to help diminish the likelihood of incurring future, similar losses.

The intent of this investigation is to determine how and where performance or procedures can be improved to diminish the likelihood of having fire service members becoming injured or being killed in the course of their work-related duties. A detailed investigation is often required to reconstruct what happened and how conditions and actions contributed to the situation. The purpose of the investigation is to identify inadequacies in policy, procedures, systems, equipment and human behaviour or other factors that contributed to the incident and to make corrective recommendations to improve member safety.

## Process

Effective investigations can help us describe what happened, determine the real causes, evaluate the risks, develop controls, define trends and demonstrate concern.

This requires the investigative team to collect information, analyze all causes, develop and take actions, report findings, make recommendations and follow-up on recommendations.<sup>3</sup>

The investigative model employed by the Workers' Representatives employed Frank Bird's problem-solving model (sometimes referred to as the domino model) in order to uncover the root causes that led to this incident.<sup>4</sup> This model starts with the loss of the incident and works backwards by identifying the actions that led to the injuries and then analyzing each of the contributing factors in an effort to identify the immediate, basic and root causes of the incident. Typically the identified immediate causes are just the "tip of the iceberg". Immediate causes consist of unsafe conditions and unsafe acts. Basic or indirect causes consist of personal factors and job factors. Root causes or lack of control is the result of inadequate systems, standards or compliance.

This Report is informed by the concept of "safety culture" and applies this concept in the analysis of the Forward Avenue fire.

*"The concept of safety culture is the most recent stage in the development of safety management thinking and theories of system failures and accident causation. Over the last few years, these stages have included technical period, the human error period, the socio-*

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3 Accident/Incident Investigation Det Norske Veritas (U.S.A.), Inc., 3805 Crestwood Parkway, Suite 200, Duluth, Georgia 30096, 1997

4 Bird, Frank E. and Germain, George L. *Practical Loss Control Leadership*, International Loss Control Institute, Inc. 1996

*technical period, and the current period focusing on organizational culture (Weigmann et al., 2004).*

*In each of these stages, a different approach was taken towards accident investigation and analysis. In the technical period, the focus of accident causation was on technical and mechanical systems and the design, construction, and reliability of equipment. For the fire service, this might include efforts to improve the safety-related features of building construction and the reliability or functionality of firefighting equipment.*

*The focus of the human error period was on the faults or mistakes of human operators rather than mechanical or technical failures. Cognitive limitations of individuals were the focus of these efforts, for the purpose of assigning blame or responsibility to the people most directly involved in the unsafe act. Examples from the fire service might include accident investigation reports that point out the failure of decision making by command officers or individual firefighters that lead to unnecessary casualties on the fire ground.*

*Socio-technical errors were the next stage in the progression. In this period, errors were viewed as the result of a combination of human and technical failures or breakdowns. Current literature on safety management has focused on the concept of organizational culture as a critical factor in organizational safety. People in organizations operate within the context of a particular culture that influences the attitudes and behaviours of those individuals with regard to safety issues.”<sup>5</sup>*

The analysis presented herein examines the historical context of Ottawa Fire Services to develop for the reader an understanding of the organization, its culture and decision-making. This analysis will serve as a means to understand root causes of the Forward Avenue fire and the issues arising from it, for the purpose of making recommendations to prevent additional lost time injuries or potential Line of Duty Deaths in the future.

The initial phases of this Report began on April 12<sup>th</sup> 2008 with the request for the assignment of an investigative team by Peter KENNEDY, President of the OPFFA to worker Health and Safety Chair Stephen MCFARLANE. The five OPFFA members of the JOHSC, three of whom had only recently assumed their duties on the committee, were assigned to the Report development process.

The Chair and JOHSC member Raymond BALCOM elected to not conduct worker interviews as both were officers on active duty at the fire. Equally, the Chair’s selection of the worker’s Designated Investigative Representatives was based on the desire to avoid any barriers to worker reporting created by the relationship of supervising officer.

The team evaluated written, photographic, audio and oral reporting of the event and conducted fifty interviews that encompassed the Communications, Suppression, Safety, Training and Fire Prevention Divisions.

The interview process consisted of an open-ended questionnaire. The persons interviewed were informed of their right not participate in the process and to stop at any time should they so choose. Interview subjects were also informed that all notes taken and information captured on the questionnaire would be held in strict confidence with no direct attributions or quotes used unless expressly permitted by the interviewee.

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5 Pessemier, W., *Developing a Safety Culture in the Fire Service*. International Fire Service Journal of Leadership and Management, 2008.

The investigative team developed a chronological sequence of events using dispatch data and audio logs, the Ottawa Fire Services Report on Forward Avenue Fire, witness statements, reports on Ladder 11, Post Incident Analysis reporting, Safety Officer reporting, interview notes and photographs to develop an understanding of the actions taken at the emergency scene. These actions were evaluated along with the conditions on scene to identify and determine the following:

- Actions that may have contributed, directly or indirectly to the five critical injuries
- Identify immediate, basic and root causes to prevent future occurrences
- Compliance with existing policies, standard operating procedures, training and practices
- Adequacy of existing policies, standard operating procedures, training and practices
- The impact of the event on the workers, their families, and their social well-being.
- Industry best practices

During the investigative process the team encountered significant grief within the workplace with the predominant stage exhibited being anger. Based on the lack of identified processes and interview notes within the OFS Major Case File the team was unable to establish whether the Command Officer (District Chief Gary FOSTER) had been interviewed though he did provide a chronology of events to the file. Most expressed a sense of frustration and disbelief that such a critical occurrence would not necessitate their input being sought by the Ottawa Fire Service.

This Report formally, commenced some fourteen months after the event, is the worker's voice and hopefully will bring some emotional closure to a painful event.

Based on the detailed analysis set out in this Report, together with a thorough review of best practices in the fire services, the worker group presents a list of recommendations to correct the identified deficiencies in the hope of preventing a similar event from occurring in the future.

Some of the recommendations may be controversial or foreign to our organization. The Workers' Representatives' goal is that these recommendations engage the reader; encourage corrective action, and help make positive organizational changes as it relates to health & safety.

It is through these recommendations that we can begin to address ongoing operational hazards, reduce lost time injuries and the potential for Line of Duty Deaths ("LODD") in our workplace and affiliates throughout North America.

## Recommendations

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### *Investigative Process*

It is recommended that:

- OFS and the OPFFA through the JOHSC establish specific terms of reference for the investigation and reporting of LODD(s), critical injuries and near misses.
- OFS provides health and safety representatives with training in critical injury / fatality / near miss investigation and report writing.
- OFS establish written procedures detailing the requirements for scene preservation and documentation in the event of a critical injury / fatality / near miss.
- OFS establish a sealed investigations toolbox for use by designated representatives containing basic equipment for scene preservation and documentation and locate the toolbox on Safety Car 23 and a spare within the Safety Office for multiple incidents.
- OFS establish a procedure for sharing investigative reports within and outside OFS.
- Section 21 Health and Safety Advisory Committee establish a Guidance Note detailing requirements for investigation and reporting of LODD(s), critical injuries and near misses.
- MOL employ a member of the Ontario Provincial Fire Fighters Association as a policy advisor or specialist to investigate fire related complaints, serious injuries and LODD(s).

## Building Construction

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The two buildings on fire upon arrival of the OFS were part of a five building complex owned by Ottawa Community Housing.

Both buildings are of wood frame construction characterized by wood stud walls, platform frame floors on dimensional wood joists and a gable style roof of wood truss/oriented strand board construction with asphalt shingle cover. Exterior finishes are of brick veneer above the concrete formed foundation walls and a combination of brick veneer and aluminium siding on the upper floors. Interior finishes consisted of drywall ceilings and walls and a variety of floor finishes.

The structures may be classified as 3 storeys in height by code but are in effect 4 storeys/levels by virtue of the lower floor arrangement of concrete formed walls that are predominantly above grade.

The building of origin (Building 1) is a 6 unit residential occupancy of the stacked town home style and the initial exposure building (Building 4) consisted of 8 units similarly arranged.

The buildings by site arrangement share a rear yard enclosed by 6 foot high fences with exterior gate access via the walkway between Building 1 and Building 2.



Photo courtesy of Ottawa Fire Services

# Forward Avenue Site Plan 1



Drawing by Peter McBride



## Building 1 – Building of origin

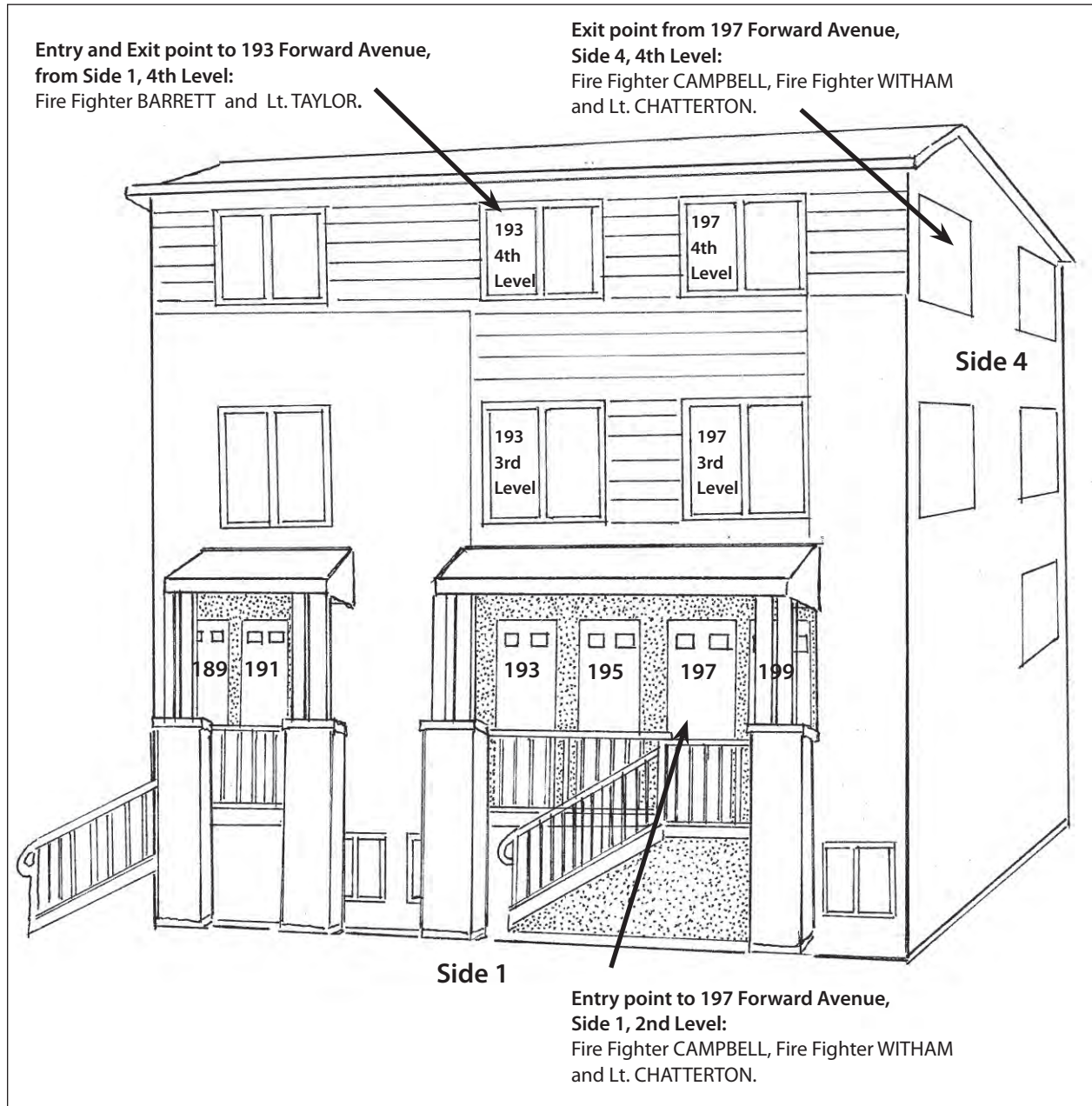
189-191-193-195-197-199 Forward Avenue

The entrances are accessed above grade such that half the entrances served Levels 1 and 2 (191, 195 and 199 Forward Avenue) and the other half served Levels 3 and 4 (189, 193, and 197 Forward Avenue). Apartments not served by exits to grade level in the rear yard have exterior balconies constructed of wood joists and decking.



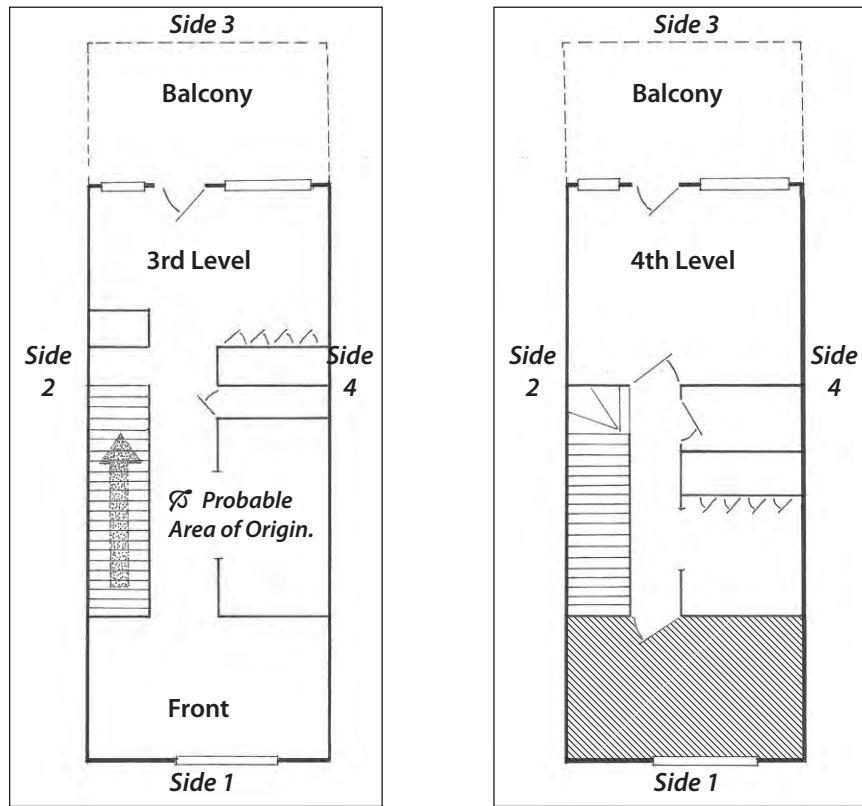
Photo courtesy of Scott Stilborn

**Building 1: Sides 1 and 4 showing**



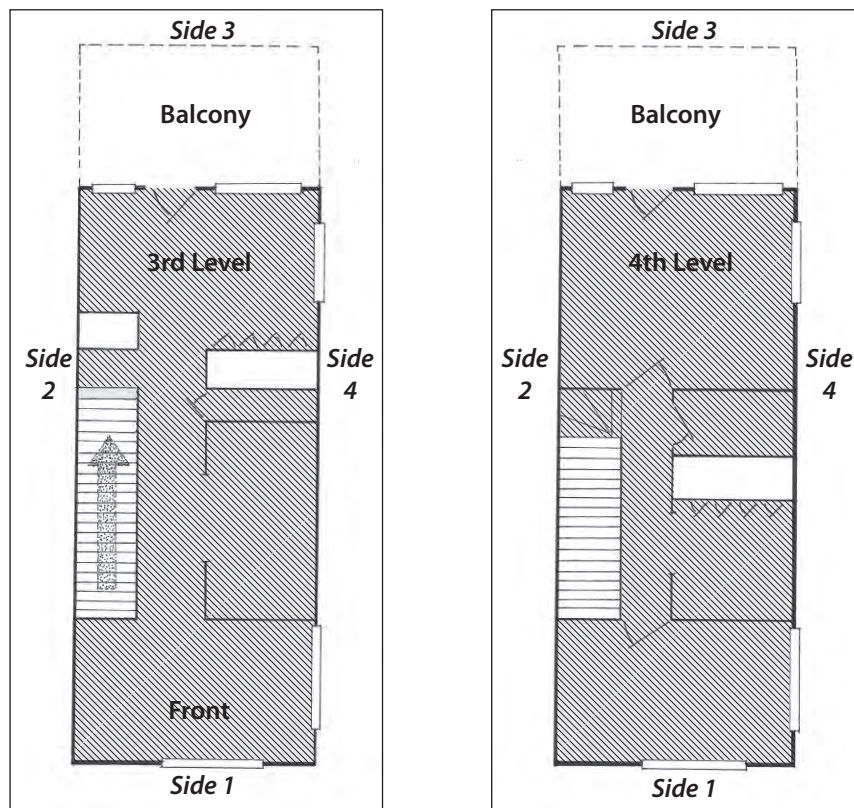
Drawing courtesy of John Gagnon

**Building 1: 193 Forward Avenue, Area searched by Ladder 11**



Drawing courtesy of John Gagnon

**Building 1: 197 Forward Avenue, Area searched by Pump11B**



Drawing courtesy of John Gagnon

## Building 2 - Exposure 2

187 Forward Avenue – 26 units

This four level structure is of Wood Frame construction over a partially below grade concrete formed open air parking garage. The garage slab and dwelling service utilities are protected by suspended gypsum. The parking area (18 spaces) along with the mechanical and storage rooms therein have no interior communication to the units above. The roof system is a hip style roof of truss/oriented strand board construction with asphalt shingle cover. Exterior finishes are a combination of brick veneer and aluminium siding on the upper floors. Access to dwelling units is from exterior staircases arranged on three sides and atypically with no interior center hallway for a structure of this scale.



Photo courtesy of Scott Stilborn

### **Building 3 - Exposure 3**

202 Hinchey Avenue

This building a condominium known as Ottawa House is not part of the complex owned by Ottawa Community Housing.

The four storey residential structure is of fire resistive construction with concrete formed walls and floors and clad in brick veneer. The roof system is comprised of a concrete deck with insulating foam and built up tar and gravel cover with false mansard elements detailed around its perimeter.

The rear of this structure is sited approximately twenty feet from Buildings 4 and 4A and is enclosed by a 6 foot high wooden fence.

**Rear of 202 Hinchey Avenue**



Photo courtesy of Scott Stilborn

## Building 4 - Exposure 4

201-203-205-207-209-211-213-215 Forward Avenue

The entrances are accessed above grade such that half the entrances served levels 1& 2 (201, 207, 209 and 215 Forward Avenue) and the other half served levels 3 and 4 (203, 205, 211 and 213 Forward Avenue). Apartments not served by exits to grade level in the rear yard have exterior balconies constructed of wood joists and decking. (Note: Building 1 has been rebuilt with no windows on Side 4)



Photo courtesy of Scott Stilborn

## Building 4A - Exposure 4A

217 Forward Avenue – 26 Units

This structure is a twin in its design and construction to Building 2.



Photo courtesy of Scott Stirlborn

### Building and Fire Codes

The design and construction of this Ottawa Community Housing complex is demonstrative of the challenges faced by firefighters across North America when compartment fires have propagated to structural elements or other structures and why the OPFFA has advocated for code changes both provincially and nationally.

Simple code changes to require interconnected alarm systems in this class of building would have probably resulted in far earlier discovery by residents and therefore earlier intervention by OFS.

Many evacuated residents had no idea of the scale and scope of fire and exhibited shock on exiting their residences; especially those taking showers when alerted to the fire by OFS members forcing entry into their dwelling unit.

Another simple strategy is to require wall cladding/sheathing assemblies that resist fire or non-vented eaves along closely spaced walls to limit the growth and spread of fire into roof spaces until the fire service arrives for control. Fire exiting from a window of one building quickly radiates energy onto the adjoining structure or upwards to the eaves and results in rapid fire growth in the exposed building and/or the structure of origin.<sup>6</sup>

6 *Safe Buildings and Fire Behaviour*, The City of Calgary, Building Regulations Group & Calgary Fire Department, Report Version 3.0, October, 2006

A single sprinkler head would have probably controlled this fire in its incipient stage. Strikingly, the reconstructed building complex (see photo below) demonstrates in their close proximity the need for code change when building for density with combustible structures and is a primary factor in why this fire evolved as it did.



Photos courtesy of Scott Stilborn

Building 1, rear (Side 3)



## **Descriptive Building Terminology**

OFS has no standard set of descriptive terms for structural identification/classification. The tactical importance of which cannot be overlooked at this incident or future events. These structures by design are four storeys in height but typically are viewed as three storeys. These structures can also be called stacked two storeys up and down. The tactically important issue arises in describing the fire by its location relative to its position within the building. For an officer to inform Command that a fire is in unit X down versus unit Y up has tremendously different exposure potential and therefore resource requirements. The fire problem can be identified by the descriptive terminology.

Another example might be to pose the question what is the difference between a basement, cellar and a crawl space? A basement has windows and a cellar does not and a crawl space may or may not allow for access – all three spaces have different tactical challenges and in the use of the descriptive terms one can quickly establish the appropriate strategic and tactical possibilities for dealing with fire within these spaces.

The danger arises when we do not have the terminology and we incorrectly assign a name such as a basement to a cellar and call for exterior crews to ventilate or as we will see within this report - the misidentification potential for location of trapped or disoriented firefighters within a structure when calling or providing assistance.

The Ottawa Community Housing Complex illustrates building and fire performance deficiencies that led to the growth and spread of this fire. Firefighters operating within structures on fire require tactical guidance and descriptive terminology to operate safely. The Workers' Representatives make the following corrective recommendations.

## **Recommendations**

### ***Building Construction***

It is recommended that:

- The Corporation of the City of Ottawa (“the Corporation”), OFS and OPFFA advocate for provincial and national building and fire code requirements that limit the growth and spread of fire.
- The Corporation evaluate the Forward Avenue building complex and through that evaluation incorporate fire safe design within future Ottawa Community Housing Projects.
- Ottawa Community Housing retrofits fire resistive cladding or installs unvented eaves in the area where Building 1 and Building 4 are not spatially separated.
- The Corporation direct Building Services to inspect Ottawa Community Housing building stock for any similarly configured spatial separations and undertakes corrective actions where warranted.
- OFS establish and define descriptive building terminology for use within operations and that the terms are incorporated into tactical manuals.
- OFS update and deliver a comprehensive Building Construction - Strategic and Tactical Considerations course.



# The Incident

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## Sequence of Events

The following sequence of events is derived predominately from the OFS Dispatch digital audio logs. Additional explanatory notes have been provided for clarity and continuity.

12:28:05 hrs

The alarm was received by Ottawa Fire Services (“OFS”) Dispatch as a fire on a balcony. Car 10 (District Chief Gary FOSTER), Pump 11A (Captain David THOMPSON), Pump 11B (Lieutenant John CHATTERTON) and Ladder 11 (Lieutenant Tim TAYLOR) are dispatched for a reported structure fire.

Pump 11A, normally the lead apparatus from the station, directs Pump 11B to proceed first as Pump 11A has insufficient air pressure to release the maxi-brakes.

12:30:28 hrs

While on route Ladder 11 notifies Dispatch that a lot of black smoke is visible. Dispatch acknowledges the message and reports receiving multiple 911 calls.

12:31:11 hrs

Pump 11A, trailing Pump 11B and Ladder 11, follows them onto Hinchey Avenue and advises Pump 11B that Pump 11A will assume the front door. In doing so Pump 11A returns the “Unit” (11A, 11B & Ladder 11) to it’s predetermined assignments upon arrival.<sup>7</sup>

12:31:44 hrs

While on route Car 10 calls Dispatch and declares a “Working Fire”.

12:32:37 hrs

Pump 11A calls Pump 11B and tells them to “keep going, get out of the way” unaware that two garbage trucks are blocking Hinchey Avenue and their operators are out of the vehicles looking at the fire.

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<sup>7</sup> Note to reader: See Section on Strategy and Tactics - Urban Tactics



Photo courtesy of Ottawa Police Services

12:32:37 hrs

Unidentified unit advises Car 10 to access Forward Avenue from the Parkdale side due to congestion on Hinchey and Lyndale Avenues.

12:33:40 hrs

**(1 OFS member at scene [Car 10])**

Car 10 assumes Command and gives a size up to Dispatch indicating “a dead-end street, three storey fully involved in more than one place with people trapped on the third floor”.

At the same time Command orders Ladder 11 in and situated for the *third floor*<sup>8</sup> rescue along with lines to be laid by Pump 11A to the rear of 187 Forward.

12:34:12 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

11 Unit arrives on scene with Pump 11A Officer acknowledging Command’s order.

12:34:32 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Pump 11A Officer notifies Command that there are actually two buildings on fire.

Command acknowledges Pump 11A Officer, calls Dispatch and prompts Ladder 11 crew to get the ladder up to remove the male occupant who is leaning out the window due to smoke conditions.

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8 Note to Reader: See Section on Building Construction – Descriptive Building Terminology

12:34:57 hrs

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**(12 OFS members at scene [Car 10, 11 Unit])**

Dispatch confirms the second building fire at 12:34:57.

Ladder 11 Officer Lt. TAYLOR and Fire Fighter Gerald BARRETT are riding the extending ladder up to the window and urging the occupant not to jump while Ladder 11 Operator Fire Fighter Scott LOUSLEY manoeuvres the ladder into position.

F.F. LOUSLEY, unable to see the tip of the ladder with the two firefighters positioned in the ladder way, relies on hand signals for directional guidance and during placement strikes the window frame of the building.



Photo courtesy of Ottawa Police Services

12:35:02 hrs

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**(12 OFS members at scene [Car 10, 11 Unit])**

Pump 13A (Captain Raymond BALCOM) books on the air responding. Command requests additional responding apparatus to stage on Lyndale Avenue.

12:35:48 hrs

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**(12 OFS members at scene [Car 10, 11 Unit])**

Dispatch provides Command with a response line up of Pump 23 (assigned as Accountability); Pump 13A (assigned as Rapid Intervention Team), Safety Car 23, Rescue 12 and Car 20 and queries Command for any additional rig requirements.

Command responds that, "we have a second response" ... .. "have we got a second aerial coming?" Dispatch responds in the negative.

12:36:13 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Command requests the 2<sup>nd</sup> Ladder and directs the apparatus to position at rear of the involved structures via Hinchey Street.

12:36:41 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Pump 11A Officer has just learned from Ladder 11 Officer that the rescued male occupant is reporting that his mother is still inside.

Pump 11A Officer radios Pump 11B Officer and directs him and his crew to conduct a primary search of the building of origin.

Pump 11B crew (Lt. CHATTERTON; Fire Fighter Robert WITHAM and Probationary Fire Fighter Carissa CAMPBELL) have advanced a line to the exposure, Building 4, and are about to make entry when they are reassigned.

12:36:52 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Pump 11B Officer seeks clarification as to which building is the building of origin as there are two structures heavily involved in fire.

12:37:11 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Pump 11B crew leaves their line at the front of Building 4 and moves to the building of origin, Building 1, to assist in the search operation.

Ladder 11 Officer and Fire Fighter BARRETT have the rescued male occupant on the ladder and assist in his descent. Pump 11B crew make their way to the front of Building 1.



Photo courtesy of Ottawa Police Services

12:37:13 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Command directs Pump 11A Officer to give him an assessment of the exposure building, Building 4, and assumes responsibility for the building of origin, Building 1.

12:37:16 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Pump 11A acknowledges the assignment and informs Command that “my crew has a 2-½ inch attempting to stop it; it’s heavily involved the second building in the roof; I am going to start a primary search myself, B Pump is doing the primary building”.



Photo courtesy of Ottawa Police Services

12:37:30 hrs

**(12 OFS members at scene [Car 10, 11 Unit])**

Command acknowledges Pump 11A Officer's assessment and assignments. Command notifies Dispatch that "at this time we are retrieving one person off the third floor, building number 201". Dispatch acknowledges the transmission.

Command is identifying to Dispatch that Ladder 11 is making entry for the person reported trapped.

Pump 11B crew have forced entry into 199 Forward Avenue (Fire Fighter CAMPBELL had to run back to Pump 11B to get a Halligan tool as they have only brought the sledge) and Lt. TAYLOR and Fire Fighter BARRETT have made entry into 197 Forward Avenue via the ladder to undertake the search for the rescued man's mother.

Fire Fighter LOUSLEY has masked up and taken a position at the tip of the ladder to act as an exit location beacon for the entry team of Lt. TAYLOR and Fire Fighter BARRETT by focusing the ladder spotlights and use of his voice.



Photo courtesy of Ottawa Police Services

12:37:55 hrs

**(12 OFS members at scene [Car 10, 11 unit] + 4 on location [P23])**

Pump 23 (Captain Bruce WARREN) books on location and is directed by Command to assist Pump 11B with getting more lines off to address the exposure issues along with querying the availability of an additional source of water supply.

12:38:19 hrs

**(12 OFS members at scene [Car 10, 11 Unit] + 4 on location [P23])**

Dispatch calls Command and asks if he wants a 2<sup>nd</sup> Alarm.



12:38:23 hrs

**(12 OFS members at scene [Car 10, 11 Unit] + 4 on location [P23])**

Command replies: "Yeah, let's go ahead and do that for now."

12:38:46 hrs

**(12 OFS members at scene [Car 10, 11 Unit] + 4 on location [P23])**

Pump 23 updates Command on hydrant availability and is directed to lay an additional supply line in as support is needed with large supply.

12:38:52 hrs

**(12 OFS members at scene [Car 10, 11 Unit] + 4 on location [P23])**

Pump 23 acknowledges the order.

Pump 23 crew undertakes a hand stretch of 5" supply line from their pump on Lyndale Ave. to Pump 11A and augments the stretch with additional line from pump 11A.

12:38:57 hrs

**(12 OFS Members at scene [Car 10, 11 Unit] + 5 on location [P23, SO23])**

Safety Car 23 (Captain Richard GILES) books on location and is acknowledged by Command.

12:39:04 hrs

**(12 OFS Members at scene [Car 10, 11 Unit] + 5 on location [P23, SO23])**

Car 6 (Platoon Chief Gerald HILL) books responding

12:39:17 hrs

**(12 OFS Members at scene [Car 10, 11 Unit] + 6 on location [P23, SO23, Car 20])**

Car 20 (District Chief John GAGNON) books on location.

12:39:27 hrs

**(12 OFS Members at scene [Car 10, 11 Unit] + 6 on location [P23, SO23, Car 20])**

Command acknowledges Car 20, gives a brief report of two buildings alight and assigns Car 20 to look after the Building 1. Additionally Command identifies that the "Captain" (THOMPSON) is looking after Building 4 which is fully involved on the third storey and that we have two Buildings, 1 and 4, fully involved.

12:40:00 hrs

**(13 OFS Members at scene [Car 10, 11 Unit, Car 20] + 5 on location [P23, SO23])**

Car 20 assumes Operations.

12:40:02 hrs

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**(13 OFS Members at scene [Car 10, 11 Unit, Car 20] + 9 on location [P23, SO23, P13A])**

Pump 13A books on location and queries Command as to assignments since 13A was dispatched as RIT. Command changes their assignment to conduct a search for trapped occupants in Building 4.

12:40:30 hrs

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**(13 OFS Members at scene [Car 10, 11 Unit, Car 20] + 12 on location [P23, SO23, P13A, R12])**

Rescue 12 (Acting Lieutenant David MCDOUGAL) books on location and is directed by Operations to attend Pump 11B's location as they are to be assigned to the exposed structure.

12:41:10 hrs

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**(13 OFS Members at scene [Car 10, 11 Unit, Car 20] + 12 on location [P23, SO23, P13A, R12])**

Operations calls Pump 12 for assignment. Pump 12 Officer (Acting Captain James ROSS) advises they are responding and are on the Queensway at Bank Street.

12:41:14 hrs

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**(13 OFS Members at scene [Car 10, 11 Unit, Car 20] + 12 on location [P23, SO23, P13A, R12])**

Command directs Ladder 13 (Acting Lieutenant Giles CRETE) to set up and protect exposures from the rear (Hinchey Street) if Ladder 13 can get in there. Ladder 13 acknowledges the order while still responding.

12:42:48 hrs

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**(18 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A] + 7 on location [P23,R12])**

Pump 13A calls Command to confirm assignment as they have reached Building 4. Command confirms the search assignment and directs 13A to see Captain THOMPSON as he is already conducting search operations in the exposure building. .

12:42:49 hrs

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**(18 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A] + 8 on location [P23,R12, Car 6])**

Pump 13A notifies Command that he is now meeting "face to face" with Captain THOMPSON and will be replacing him as Fire Attack.

12:42:59

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Operations calls Command and gives an assignment update with Pump 11A assuming Fire Attack and Pump 13A assigned to Search and Rescue.

12:43:19 hrs

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**(18 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A] + 8 on location [P23,R12, Car 6])**

Command acknowledges the assignments.

12:43:22 hrs

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**(18 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A] + 8 on location [P23,R12, Car 6])**

Pump 11B Officer radios from inside the building of origin: “We are in trouble... ..trapped on the first floor... .. get some doors and windows open.”

The 11B crew have left the fourth level and while descending to the third level are enveloped by smoke with no visibility and high heat conditions that is instantly painful and life threatening.<sup>9</sup>

The radio message from Pump 11B Officer is not acknowledged.

12:43:39 hrs

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**(19 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6] + 7 on location [P23,R12])**

Operations calls Command requesting a 3<sup>rd</sup> Alarm.

12:43:42 hrs

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**(19 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6] + 7 on location [P23,R12])**

Command acknowledges Operations request.

Operations has no one available to stretch a line down the Side 2 walkway of Building 1 and Car 6 orders him to grab a 2-½ inch line off Pump 11A as the fire is threatening Exposure 2. Car 6 assumes Operations but, it is not communicated due to radio traffic.



Photo courtesy of Ottawa Fire Services

12:43:44 hrs

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**(19 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6] + 7 on location [P23, R12])**

Command asks Dispatch what is the next pump in.

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9 “Supra” Note # 4

12:43:49 hrs

(19 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6] + 7 on location [P23,R12])

Dispatch notifies command that Pump 22 will be next in pump.

There is a breakdown in radio communications as static begins to interfere with radio transmissions. The heat of the fire has melted the wire insulation on Fire Fighter WITHAM's radio creating an open microphone.

Dispatch reports receiving a "Man Down" alarm from portable radio # 9485, Operations calls Command. The heat of the fire has melted the wire insulation on Lt. CHATTERTON's radio creating a short that initiates the man down button.

Lt. CHATTERTON has lead his crew to the Side 4 window on the fourth level as visibility and heat conditions precluded their descent via interior stairs and he gives the order to jump to Fire Fighters CAMPBELL and WITHAM.

Pump 11A Fire Fighter CARON calls Command to identify that we have a man down.

CARON is manning the 2-½ inch exposure line in the parking lot and he calls Command in the realization that the blackened lump in the parking lot is a firefighter and not a piece of the building fallen to the ground.



Photo courtesy of Ottawa Fire Services

Ladder Operator LOUSLEY descends the ladder to move it over to Side 4 thinking his ladder crew are exiting on Side 4.



Photo courtesy of Ottawa Police Services

12:45:00 hrs

**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Command calls Dispatch and requests ambulance staff to attend as a firefighter has come out of the top floor window. Pump 23 members have just relieved Car 20 on Side 2, Pump 23 Officer undertakes the establishment of Accountability.

12:46:00 hrs

**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Dispatch notifies Command that the “Man Down” alarm is from Pump 11B Officer (portable radio # 9485). Dispatch calls again seeking confirmation of message received.

Fire Fighters A. ELLIS (Rescue 12) and CARON move Fire Fighter CAMPBELL away from the building as Fire Fighter WITHAM is hanging from the window sill about to jump.

Car 6 has ordered the movement of Ladder 11 to the window and the Ladder does not respond to the turntable controls.

12:46:08 hrs

**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Dispatch calls Command again and reports a second “Man Down” alarm is being received from portable radio # 9616 assigned to Pump 11A Crew.

Fire Fighter CARON has activated his man down button in an attempt to communicate that fire fighters are down. Residents and civilian observers are screaming in horror as they react to the sound and sight of bodies hitting the ground and the tremendous volume of fire being fanned by the wind. CARON returns to manning his line as the fire is threatening the parking lot position and those in it.

Dispatch calls Ladder 21 and requests they switch channels.

HILL (Car 6) orders GILES (SO23) to go down the street to get paramedics. As Giles is moving down the street Ladder 11 crew are jumping from the window.

12:46:55 hrs

**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Command notifies Dispatch that “the four firefighters are down and have come out of the third storey roof. “

Ladder 11 is locked out and the Ladder 11 search team are at their entry point with no means of egress due to the movement of the ladder and they are forced to jump to a shed roof two levels below.

Fire Fighter BARRETT is the first out and he manages to catch the eaves trough with the toe of his boots and arrests his fall to the ground. Lt. TAYLOR follows and he becomes entangled in draperies and exits the window head first. He is grabbed and stopped from going over the roof by Fire Fighter BARRETT.

Fire Fighter LOUSLEY leaves the turntable and attempts to trouble shoot the ladder problem.



Photo courtesy of Ottawa Police Services



Photo courtesy of Ottawa Police Services



Photo courtesy of Ottawa Police Services



Photo courtesy of Ottawa Police Services

12:47:20 hrs

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**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Command calls Dispatch seeking confirmation of the receipt of his earlier message.

12:47:22 hrs

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**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Dispatch confirms the message.

12:47:31 hrs

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**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Command repeats the request for ambulances

12:47:37 hrs

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**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Dispatch acknowledges this request

12:47:42 hrs

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**(26 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12])**

Command requests an additional alarm

12:47:49 hrs

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**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain])**

Command requests Dispatch sound the Evacuation Tones and Dispatch undertakes the procedure.

Off duty Station 11 "B" Platoon Captain James BLOOM who was passing by, laid 5" supply line to Ladder 11, then renders assistance to the downed fire fighters.





Photo courtesy of Ottawa Fire Services

12:48:09 hrs

**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM])**

Dispatch transmits the Evacuation Tones on Talk Group 1-1

12:48:38 by hrs

**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM])**

“Dispatch Operations this is Forward Avenue Fire” is transmitted by Operations (Car 20)

The scene is chaotic and is reflected in the mangled radio call from Car 20 who in his next transmission demonstrates his discipline and efforts to establish control over a fire that is threatening multiple buildings.

12:48:41 hrs

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**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM])**

Command replies "Go Ahead"

12:48:46

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**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM])**

- Operations asks, "Command, what's that 2<sup>nd</sup> Ladder we have?"
- Command replies, "Second Ladder is 13. They are set up at the back."

12:48:56 hrs

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**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM] + 4 on location [L13])**

- Operations confirms, "Ya! They can get in an entryway and get up"
- Command replies and gives a stream of consciousness confirmation and series of orders as events out pace the ability to communicate and manage the Command function.
- "Acknowledge!"
- "13 did you copy?"
- "We got to get you in the sky".
- "We need you to feed with water."
- "Next in coming pump, I want you to float 13 Ladder".

12:49:08 hrs

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**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM] + 4 on location [L13])**

- Command orders "Make sure they get lots of water. Next in coming crew that comes into the scene here."
- "I want you to supply Ladder 13 with water. There is lines laid into it".

12:49:27 hrs

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**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM] + 4 on location [L13])**

Command reports to Dispatch, "All guys are occupied at this time".

12:49:34 hrs

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**(27 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12 and off duty Captain BLOOM] + 4 on location [L13])**

Rehab 54 books on location with Command and is not acknowledged.

12:49:43 hrs

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**(31 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12, off duty Captain BLOOM, and L13])**

Ladder 13 Officer calls Command who acknowledges with "Go ahead Ladder 13."

12:49:53 hrs

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**(31 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12, off duty Captain BLOOM, and L13])**

Ladder 13 Officer (G. CRETE) reports "Yeah Chief we are going to set up the ladder here." "Plus we have a 2-½ inch on some exposures here, because we have quite a bit exposed in the back."

The ladder water way had limited access to the fire from its position due to hydro lines and set back.

The 2-½ inch hose line ordered into position by Ladder 13 Officer CRETE is applied to the rear of 202 Hinchey Street as the exposed face of the building is steaming from the radiant heat projected from the wind driven fire.

This line is only the third hose line placed into service at this fire and the fourth line, also a 2-½ inch, is operated from this position to handle the fire being driven onto their position by the wind.

The ability to advance on the fire and attack is hampered by the fences that aren't cut until other crews arrive.

12:50:23 hrs

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**(31 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12, off duty Captain BLOOM, and L13])**

Forward Command is called by Pump 13A and is acknowledged as Pump 13B by Command.

Pump 13A corrects the acknowledgement by repeating his designator to Command and states "This is 13A Fire Attack." "We are on the 2<sup>nd</sup> floor and we got fire coming in on the exposure." "We can hold it and we are in a safe zone."

12:50:29 hrs

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**(31 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12, off duty Captain BLOOM, and L13])**

Command replies, "At this time I want everyone out of both buildings." "Come out of both while I hit it with some aerials."

12:50:35 hrs

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**(31 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12, off duty Captain BLOOM, and L13])**

Pump 22 (Captain Gary ATFIELD) calls Command.

12:50:48 hrs

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**(31 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12, off duty Captain BLOOM, and L13])**

Ladder 21 (S/M William DESCOTEAUX) calls Dispatch to confirm they are responding to Forward Avenue.

12:51:03 hrs

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**(31 OFS Members at scene [Car 10, 11 Unit, Car 20, SO23, P13A, Car 6, P23, R12, off duty Captain BLOOM, and L13]) + FMT (Fire Chief R. LARABIE, Deputy Chiefs - J. ULLETT, G. MILLS and B. MONTONE, Special Operations Chief K. AYOTTE and others)**

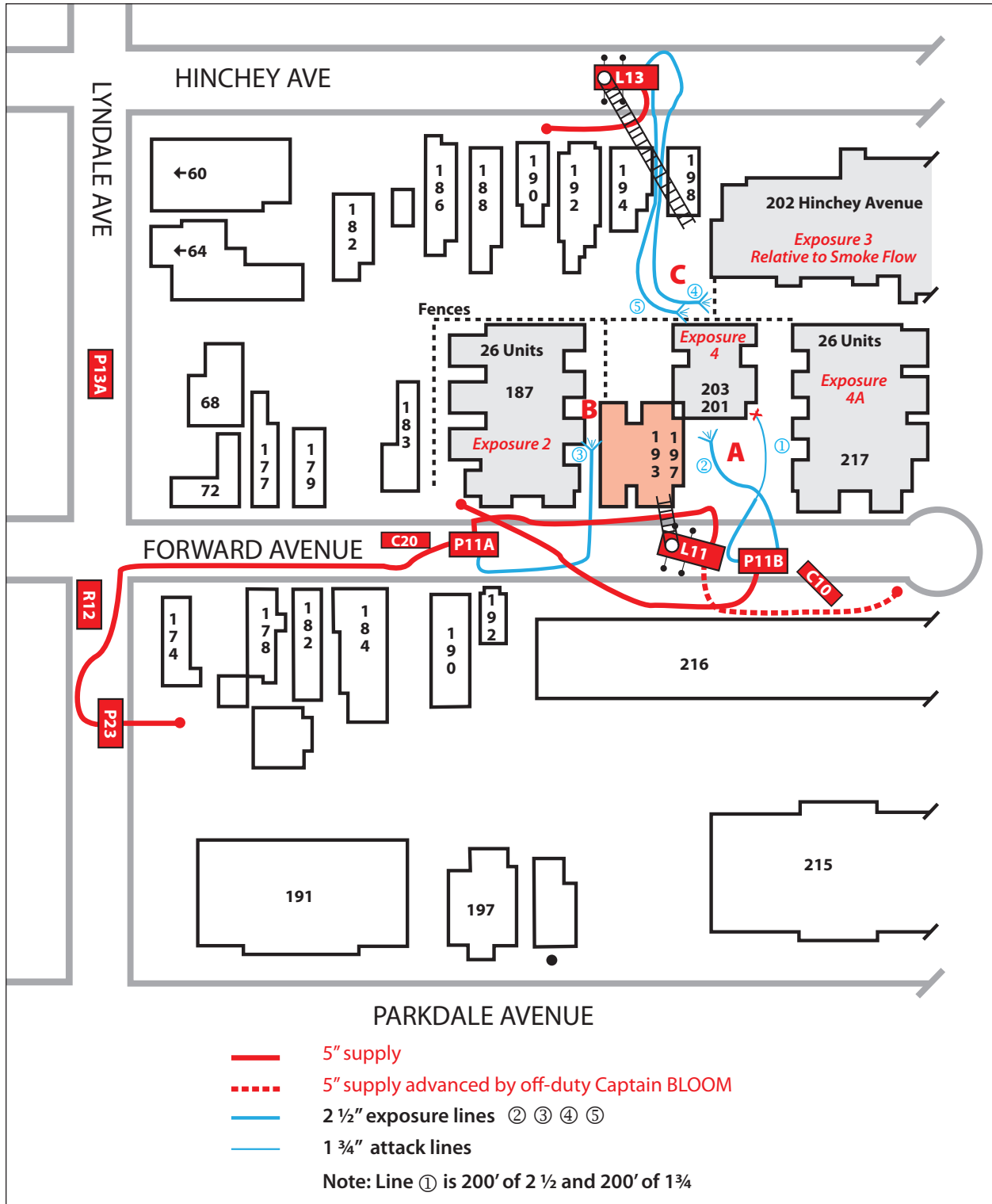
Command announces to all units, "Everybody reports to the Command vehicle first!"

Numerous FMT members have arrived at the scene are assisting with the injured and directing activities. – There is no radio record of their arrival times or directed actions on scene. No Command team is established.

At this time 5 fire fighters are injured, 5 firefighters are assisting the injured from Pump 11B in the parking lot, two are assisting the injured from Ladder 11, 1 fire fighter is manning the hose line in the parking lot (Location A on Site Plan, 2 fire fighters are staffing the hose line protecting Exposure 2 (Location B on Site Plan), 2 fire fighters are operating hose lines 3 and 4 at the rear (Location C on Site Plan). In addition 2 from Fire Management and 1 from Air Management are assisting the victims in the parking lot.

Of the 22 fire fighters available for deployment (31 – 9 {Command, Car 20, SO23, Car 6, BLOOM + 4 apparatus operators}) 17 were actively engaged with tasks and/or assignments and the five critically injured requiring assistance.

# Forward Avenue Site Plan 2



Drawing by Peter McBride

12:51:25 hrs

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Pump 22 notifies Command they will supply water to Ladder 13 and is acknowledged.

12:51:28 hrs

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Operations notifies Command that the crews from Pumps 11A and 13A are accounted for and have evacuated the structures. Operations reports three 2-½ inch lines are now in operation for control of Side 2 and Side 3.

12:53:07 hrs

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Command acknowledges the report from Operations and states, "It's Side 1 we're having the problem with".

12:53:10

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Command calls Ladder 11 and urges the application of water on Side 1.

12:53:15 hrs

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A truncated message in reply to Command is heard on the Dispatch tape from Ladder 11 Officer who is now operating the pump on Ladder 11, "There's a problem."

The Master Intake Valve solenoid has failed and water cannot be delivered to the elevated waterway. This solenoid controls the movement of the main water intake valve that would permit the water to flow to the elevated waterway via the on board pump.

The audio logs continue for many more hours however we have deliberately chosen to stop here because we believe this last statement by Lt. TAYLOR who is at this time trying to establish water supply to Ladder 11's waterway as Lt. CHATTERTON is removed to hospital, Fire Fighter WITHAM awaits treatment, Fire Fighter CARON is assisted in line control by a member of the public and Fire Fighter BARRETT is advancing a 2-½ inch hose line reflects the overwhelming findings of this report —

"There's a problem."



Photo courtesy of Jean Lalonde

Lt. TAYLOR (far left) is at this time trying to establish water supply to Ladder 11's waterway as Lt. CHATTERTON is removed to hospital and Fire Fighter WITHAM (standing right) awaits treatment.



Photo courtesy of Ottawa Fire Services

Fire Fighter BARRETT leading the advance of a 2-½ inch.



Photo courtesy of Jean Lalonde

Fire Fighter CARON assisted in line control by a member of the public.





# Strategy and Tactics

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## Historical Context

The North American fire service has evolved from its earliest days of local business owners or residents organized into fire protection societies or subscription services to complex multi-disciplinary publicly funded service organizations. Ottawa Fire Services has also through the course of its history been transformed in this same way.

The transformation of Ottawa, like so many other communities, began with unplanned settlement and construction of wood framed structures with little or no fire code guidance or understanding fire behaviour. Towns and cities across North America burnt down and in some cases multiple times before local governance insisted on non-combustible masonry walls and /or partitions between structures to restrict the spread of fire and limit the potential for conflagration. This is why many downtown historical buildings are a hundred plus years in age - generally the control worked.

The fire service fought fires initially as defensive actions (Bucket Brigades) and evolved to more offensive actions due to the advancement in fire fighting technology and to a lesser degree the relatively better fire performance of the masonry wall. These two factors resulted in the development and adoption of specific tactics suited to the types of construction (“Wood Frame” and “Ordinary”) and represents the bulk of the oral and written tactical history of the fire service.

In essence, these two types of structures and their specific performance under fire conditions led fire officers to develop controls. Over the history of the fire service strategic and tactical controls evolved experientially in response to fire problems within these two main building types. Many of these controls were, regrettably, in response to civilian and fire fighters fatalities.

‘Defensive’ tactics such as flanking and prevention/control of fire igniting exposures (other structures or combustibles) evolved in response to insufficient water supply for direct attack and/or collapse potential of the involved structure. Top-side ventilation and coordinated interior attack, often combined with search and rescue, became the hallmark of “offensive” tactics. Both tactical approaches could be modified or delayed in application or coordinated in the event of life rescue(s).

Generally, the chosen strategic decisions and their tactical implementation were built into known routines based on the order of arrival at an emergency. Operational activity was understood by playing a position with known actions to advance the tactical goals. This approach to organizing the fire or emergency incident was relatively effective particularly when portable radios were not used or limited and therefore command and control was by its very nature reliant on predesignation.

Despite the relative effectiveness of these positional practices and advancements in fire fighting technology, recurrent fire fighter fatalities reinforced the need and desire for greater safety control through a better command/control/communication (“C3”) model governed by principles of risk management.

The fire service shifted to the Incident Command System (“ICS”) to achieve those objectives. In doing so the fire service lost or discarded known positional behaviours in the mistaken notion that the ICS would provide for these positional activities and achieve a safer emergency scene.

What the implementation of ICS succeeded in doing was introducing nomenclature without the development of understanding within the worker and the worker was in conflict with what they knew operationally or experientially and what they were asked to do procedurally.

The introduction of the ICS within the former Ottawa Fire Department (1997), as well as within other fire departments, created chaos on the fire ground as veteran officers and fire fighters tried to cope with a system they didn't understand, had never applied, received only theoretical training, and were unsure as to how to be positional (their learned experience) within the system.

ICS was intended by its developers to be complementary to positional firefighting not exclusionary or prohibitive to positional behaviours. This created philosophical conflict within organizations that saw the ICS and its imposition as a hindrance to firefighting operations and in some instances ignored in practice because it had been "proven" to not work when it really counted.

This organizational conflict was really a function of the failure to manage change through understanding and communication of ICS objectives, developmental training, realistic simulation and functional staffing to support its use in the field.

The ICS did not change the strategic and tactical realities and still required positional pre-designated behaviours/ actions but, it did so with an inherent capacity to expand or contract based on the operational needs of the emergency and safety oversight.

ICS is highly effective when its capacity for incident management and safety are supported by training, equipment and functional staffing.

Instead, eight years following the amalgamation of the Ottawa-Carleton fire services the implementation of ICS, now referred to as Incident Management System ("IMS"), has become a bureaucratic/uninformed approach to safety whereby the conflicts between performance and safety sees a high standard of safety on paper but has imposed a completely different reality in practice under current staffing models.

The mission of protecting life, property and the environment never changed, just the way it was to be delivered and governed. The strategic and tactical approaches of defensive and offensive actions still represent the dominant operational practices for fire commanders. They are now, however, selected more on the basis of risk than for their benefits.

From their first day in the fire service, firefighters are trained to risk their lives for the lives of others, often by instinct – the fire on Forward Avenue reinforces this fact and gives us a first hand view of the reality on the fire ground.

### **OFS Urban Tactics Manual – Attached Residential Structures – Benchmark**

*The purpose of this manual is to provide officers and firefighters of the OFS with a standard tactical approach to urban fire fighting. This manual is not intended to replace the experience and judgement of the first officers on scene. It is intended to act as a guide for initial activities at a fire so that in the absence of orders to the contrary, the members of first arriving vehicles can anticipate what is expected of them and what to expect from their fellow firefighters on scene.<sup>10</sup>*

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10 OFS Urban Tactics Manual – Introduction, Chapter 1, Paragraph 1, October 2005 Edition

The introductory chapter of the OFS tactics manual reflects both traditional and modern understanding of tactics in as much as they create a set of automatic routines for arriving fire crews thus requiring limited communication and predetermined expectations for actions.

The officers and firefighters at the Forward Avenue fire demonstrated a high degree of conformance with the tactical routines that are laid out in the manual. An evaluation of their actions would rely on this manual as a benchmark.

Pump 11B members, as first arriving apparatus, assumed appropriate positioning and established an attack line to Exposure 4 for advancement on the fire showing in the upper unit adjacent to Building 1. Meanwhile the pump operator from 11B stretched a dry 2-½ inch line for use as an exposure line from the parking lot. (Note: It is evident from photographs [visible fire] and audio recordings that Pump 11 B Officer assumed Exposure 4 was the unit of origin)

Ladder 11 positioned and undertook an over ladder rescue per the manual and when informed of the additional victim undertook search operations under extremely adverse conditions within the compartment that the first victim had been rescued from.

Pump 11A members established a water supply in support of fire attack while their officer undertook a size-up. Upon reporting from Ladder 11's officer that a person was trapped in Building 1 Pump 11A officer reassigned Pump 11B (an intact crew) to the search and rescue tactics. Pump 11A officer then undertook search and evacuation of Building 4 by himself as all of his crew were occupied in establishing water supply or advancing lines.

Pump 11B crew advanced to Building 1, forced entry, advanced to the fourth level of 199 Forward Avenue to conduct a primary search. Two windows were removed for ventilation (one on Side 1 and one on Side 4) in light smoke conditions. Pump 11B crew was unaware that the unit of origin, 197 Forward Avenue was directly beside their position and below the entry point for Ladder 11 members.

Pump 11 A Officer is conducting forcible entry, search and evacuation by himself, Ladder 11 crew is actively searching and Pump 11B crew are actively searching.

The requirement for search and evacuation became the operational requirement and consistent with that requirement the officers and crew aggressively searched without the use of a hose line (see Vent Entry Search) while exterior defensive hose lines were being coordinated. Consistent with the training and offensive tactics of sophisticated urban fire services, as reflected by the Urban Tactics Manual endorsed by OFS, if the incident commander determines that the immediate evacuation of the entire structure is necessary, then all companies on scene may be required for this operation.<sup>11</sup>

Conditions have worsened as the exterior fire growth is accelerated by gusting winds and fire from Building 1 is threatening Exposure 2. Car 20 seeks Pump 12 for assignment and is informed they are at Bank Street and the Queensway – still ten minutes from arrival. Car 20 undertakes the advancement of a 2-½ inch exposure line from Pump 11A down the Side 2 walkway as no fire fighters are available to staff the needed exposure control hose line at approximately nine and one half minutes after arrival of the first response.

Car 20 requests a Third Alarm and repeats the request in the same transmission to convey urgency. He is operating at the task level because he recognizes the urgent need to control the exposure

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11 *Urban Tactics Manual* reference re: IFSTA Company Officer Page 284

and thinking tactically to support the searches under way. Fire fighters begin jumping from the building.

Fire growth and scale of this event has now outpaced the response resources allocated for a single family residence fire – the level of resources predetermined to respond to this alarm. Everyone on scene is multi-tasking or at maximal output and situational awareness has evolved to proactive measures. However, despite efforts for proactive measures tactically defensive operations are all that resources permit – and are barely sustainable given the combination of life searches and the tremendous wind driven fire conditions threatening other buildings.

*Structure fires present complex and dynamic challenges. Firefighters must protect the lives of building occupants as well as their own while controlling the fire and protecting the uninvolved areas of the structure and its contents. These conditions require that firefighters have a high level of situational awareness and make rapid and effective decisions with the limited information available.<sup>12</sup>*

The scale and threat of fire involvement and threat to life on Forward Avenue must be properly understood to appreciate why firefighters, officers and their Commander acted in the manner they did and how their decision-making evolved. To have identified their actions as the root cause of injuries lacks the operational understanding and context that is critical to evaluation and development of corrective solutions and consequently is disrespectful. What follows is intended to build understanding and context.

### **Ventilation – Vent-Enter-Search (VES)**

This section of the Report examines ventilation tactics, elements of decision making, the role of change, and fire fighter self rescue in isolation to further develop understanding of the complex strategies and numerous tactics involved in a fire of this kind.

Ventilation is the systematic removal of heated air, smoke and airborne contaminants from a structure and replacing them with fresh air.<sup>13</sup>

Tactical Ventilation is the term used to describe the actions and methods used by the fire service in ventilating a structure.

Ventilation actions are based on three main objectives:

- 1) Venting for life
- 2) Venting for fire
- 3) Venting for safety

Accomplishing the three main ventilation objectives may encompass vertical, horizontal and/or isolation of air flow using a variety of methods such as natural convection, forced mechanical/hydraulic means or physical barriers to effect or control ventilation. When the public watches fire fighters break windows or cut holes in roofs - ventilation is their objective, life safety is their goal.

VES is the term used to describe the actions of entry into a structure by a firefighter(s) such that fire may be in the adjoining compartment, above or below or any combination thereof without the aid of a hose line for the purpose of life rescue.

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12 Klein, G. A., Orasanu, J., Calderwood, R., & Zsombok, C., E. (Eds.). (1995). *Decision Making in Action: Models and Methods*. Norwood, NJ: Ablex.

13 7th Edition International Fire Service Training Association (IFSTA) *Manual on Ventilation*

The tactic typically involves the breaking of a window but may also include the creation of openings or forcing of existing ones to gain access to the compartment from an exterior position.

Once the opening is established the firefighter(s) make rapid entry into the compartment and seek out the interior door to the compartment and ensure it is closed to restrict air flow back to the fire from the now opened vent to the exterior. The interior door is checked for heat and carefully opened, if fire conditions permit, to assess for victims in the hallway but, at all times control of the door is maintained while the compartment is searched. The searching firefighter or team then exits the compartment from the original entry point with the victim or continues the tactic in an adjoining area if conditions permit.

VES is an example of “Venting for Life”. This tactic is used in the case where access by other means, staircases or other connecting interior elements are blocked or whose access from, would endanger the victim and/or rescuer by fire development or lack of timely action.

The practice of VES is well documented within the North American fire service and is responsible for a significant portion of the life rescues made by the fire fighters.

Within the Ottawa Fire Service the tactic of VES is not documented, nor is it universally understood. Many of the subjects interviewed for this Report were unfamiliar with the term, but were generally familiar with the actions. The reasons for this lack of universality has its roots in the pre-amalgamation reliance on experiential learning and operating culture resident within the constituent silos (fire services groups) that now constitute the Ottawa Fire Service.

The practice of VES within the previous Ottawa Fire Department was taught both in recruit classes and reinforced experientially on the fire ground, though the term VES was not used. Conversely, entry into a structure without the aid of a hose line was not permitted in other pre-amalgamation departments. These differences are not discussed to assign superior attributes to one group over another but, rather to identify that the respective firefighting practices (tactics) were a function of four key factors: training, experiential learning, staffing and equipment.

These factors taken together create a ‘departmental memory’ that informs *decision making* and ultimately the actions undertaken by fire personnel during crisis intervention.

## **Decision Making**

Recognition Primed Decision Making (“RPDM”) is a model of decision making used by fire ground officers when faced with crisis in the performance of their incident duties.

In his book *Sources of Power: How People Make Decisions*<sup>14</sup>, Gary Klein estimates that Incident Commanders make 80 percent of their fire ground decisions in less than one minute. Klein was one of the researchers assigned to a study conducted by the U.S. Department of Defence in an effort to develop ways to train combat field commanders to make better decisions.

The study looked at how decisions were made in stressful situations and included fire officers in the groups studied. The study found that command officers do not compare various options when faced with a crisis. Commanders instead were found to pattern match to a previous experience that approximates the given condition/ crisis and subsequently alter this decision as needed to bring the incident to a close.

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14 Klein, Gary *Sources of Power: How people Make Decisions*, MIT Press, Jan. 1998 out of print, 1999 paper.

This type of decision making is predicated on having the patterns upon which to draw to establish a strategic and tactical approach to the problem. The experienced officer has, by virtue of years of experience, attained an operational expertise through his/her exposure to events and consequent pattern building.

Conversely, the less experienced officer will have less cumulative experiences to draw upon in the role or less specific event experience and therefore less patterns/solutions to draw upon in mitigating a crisis.

The important finding of this research is not simply that experience counts, rather the key findings identify the cognitive processes underlying crisis decision making and how fire officers apply solutions to their problems.

RPDM and our understanding of how that decision making is applied in the field are of critical importance to the evaluation of this event and of developmental training provided to firefighters/company officers/commanders and ultimately the safety of all OFS personnel called to an incident.

### **Change<sup>15</sup>**

The element of change within OFS is key to understanding worker demographics. In the old, familiar systems, duties and responsibilities on the fire ground and other operational incidents were understood. This understanding came from experiential learning and operating culture. The diversity of experience and culture, created within the respective silos a collective or “departmental memory” that reinforced the opportunities to learn.

Amalgamation, while bringing many benefits, has resulted in a radical change in operating culture and loss of experiential learning. The learning curve for the varied systems introduced by amalgamation and the integration of cultures continues to be quite steep. Examples of which include the knowledge and skill sets for rural firefighting for urban firefighters vs. hazardous materials response for rural firefighters or tactical ventilation practices within the inter-urban core.

Coupled with the steep learning curve for existing staff is the significant number of new hires who are entering an amalgamated workforce that has not yet molded into an experienced operations culture from which the new hires can be mentored in a unified art and science of firefighting.

The loss of an experienced operational culture should not be construed to mean that we do not have experienced rural/urban fire personnel but, rather demonstrate that the level of skills, knowledge and experience are varied and rapidly changing. Concurrent with these rapid changes is a gradual loss of experientially trained officers (“departmental memory”) due to retirement.

These changes, when combined with emergency operations have the potential for serious losses in terms of material, personnel, exposure to litigation and the confidence of the citizens we serve. Operational experience should not be built on failure or reactive risk management as a means of managing change within the amalgamated service.

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15 *OFS Safety Division Business Case: Recommendations for Improved Operational Safety, August, 2004*

Mitigating the effects of these changes and developing an experienced operations culture in today's fire environment as well as other response types will take many years of careful planning, comprehensive training programs and a systems approach to risk management that is directed at the needs of operational safety all the while delivering effective emergency management.

The Workers' Representatives make the following recommendations for corrective action.

## **Recommendations**

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### ***Strategy and Tactics***

It is recommended that:

- OFS update the existing tactical manuals and develop, implement and maintain a series of tactical guidance manuals specific to type, occupancy and construction of buildings encountered within Ottawa.
- OFS develop, implement and maintain a strategic and tactical considerations curriculum directed at firefighter, officer and chief officer development that encompasses knowledge (theory), skills (application) and abilities (evaluation) in its design.
- OFS establish a Tactical Ventilation Program.
- OFS incorporate decision-making theory for both discretionary and non-discretionary actions within the development and delivery of strategic and tactical curriculum.
- OFS establish an operational research and development program within the Training Division. This program is to be directed at evaluating, developing, implementing and communicating educational, technical and operational solutions for tactical needs.
- OFS develop strategic and tactical guidance for operations during wind driven fire conditions
- OFS establish a Strategies and Tactics Committee comprised of Suppression, Training and Safety division members for the timely development and dissemination of the above-recommended actions.
- OFS adopt the requirements of NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments within the urban boundaries of the city.
- OFS adopt NFPA 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments within the rural boundaries of the city.

## Rapid Intervention Teams/Self Rescue System

The use of Rapid Intervention Team(s) (RIT(s)) is a precaution that can reduce risks to firefighters during structural collapse and any other unplanned events that can threaten firefighters during suppression operations<sup>16</sup>.

The effectiveness of a RIT is dependant on four key elements:

1. Standard operating procedures (SOPs),
2. Command presence,
3. Company discipline and,
4. Extensive RIT training.

Specifically, SOPs should include clear direction for dispatch, use, release and operational practices. Command presence requires a chief officer to be assigned to the sector so as to avoid having the Command become directly involved in its function and when activated Command should assign a safety sector to the rescue operation.<sup>17</sup>

Company discipline plays a key role in that firefighters must not abandon firefighting positions to assist in the rescue unless Command or conditions dictate their reassignment. Finally, RIT training should include operational practices, equipment and self rescue techniques.

The first three key elements of an effective RIT have been addressed within the development of the OFS RIT program. The last elements of training with respect to equipment and self rescue philosophy and techniques have not.

The worker's issue evolves from a fundamental shift within the industry away from reliance on RIT crews to rescue the trapped fire fighter(s) and focus on the development of situational awareness or avoidance of entrapment and far greater reliance on self-rescue techniques.

The OFS must learn from the losses of others as the following example provides. In 2001, Fire Fighter Brett Tarver of the Phoenix Fire Department died in the line of duty at the Southwest Supermarket Fire. As part of a detailed recovery process RIT procedures were evaluated and the results of those evaluations were communicated to the industry.

Effective RIT was found to be anything but rapid and many would-be RIT members could be killed in the effort to locate, package and extricate a downed fire fighter when the efforts to locate, package and extricate were undertaken by the same company or uncoordinated actions by multiple companies. Subsequently, these findings were corroborated through a similar study conducted by the Seattle Fire Department and confirmed within OFS through city-wide RIT drills.

These findings focused the OFS RIT instructors on coordinated multi-company drills, air management techniques and the development of a self-rescue system to permit rapid egress from a building.

Following the Forward Avenue fire, Fire Management Team summarily concluded and publicly stated that a bail out system would not have made any difference to the worker's injuries. The injured workers dispute that assertion and have indicated that they had time to deploy a self-rescue system - there is little doubt that the outcome would have been different had one been available.

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16 Excerpt: NFPA, *Fire Investigation Report - Bricelyn St. Fire*, Pittsburg PA February 14, 1994.

17 Excerpts: NFPA, *Fire Service Section Newsletter*, The Times, Issue 2, June 2, 1997.



Clearly, those imperilled that day would be in the best position to judge the situation and offer the most reliable advice as to rescue options.

Prior to Amalgamation it was customary for firefighters to carry a personal hose key and ladder straps as safety tools. Aside from the designed uses for these simple tools the hose key allowed a firefighter to sound a floor, break glass, punch through materials and the ladder strap was used to control a door during Vent-Enter-Search or build an anchor point.

These basic safety tools and their uses need to be returned to our firefighters and we need to adopt modern self-rescue systems as well.

The findings of the Workers' Representatives with respect to the RIT and Self Rescue System demonstrates the need for corrective action and investment in training and equipment. The following recommendations seek corrective action.

## **Recommendations**

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### ***Rapid Intervention Teams / Self Rescue System***

It is recommended that:

- OFS purchase and deploy a hose key and ladder strap for each riding position.
- OFS research, purchase and deploy a self-rescue system for all operational personnel.



# Fire Behaviour and Risk Assessments

This section of the Report examines modern fire dynamics and the critical factors affecting fire growth and their importance in risk assessments for operational planning, firefighter training and response safety.

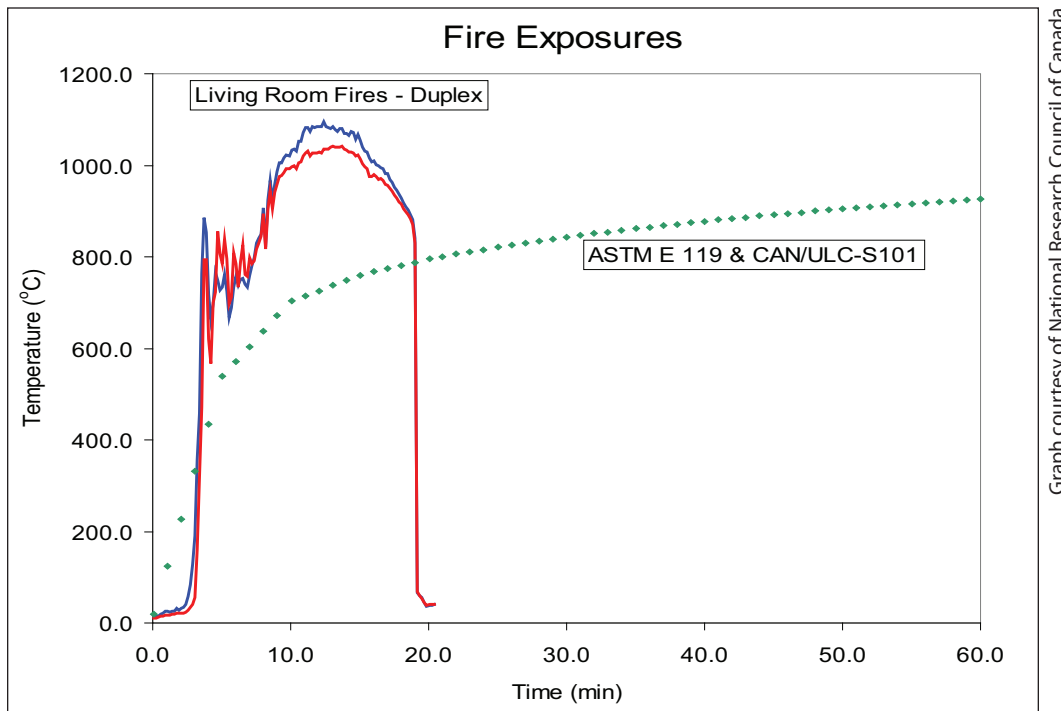


Figure 1: Rate of Change of Fire

## Fire Behaviour

National Research Council of Canada studies have demonstrated that the growth curve of fire, or the rate of change of fire, increases exponentially to a point of full development. The increasing uses of oil-based synthetics that constitute most of the contents of our homes, and more recently the adoption of synthetic structural finishes and components have resulted in a significant change in fire behaviour.

Figure 1 illustrates the rate of change of fire in today’s occupancies – what the fire service refers to as the standard theoretical fire development curve.<sup>18</sup> It is this data (green line) that fire performance of building code assemblies are predicated on with the blue and red lines showing actual aggregate results. The data curve drops at the 20 minute mark as a result of failure of the research assembly caused by the intense thermal radiation overcoming the protective capacity of the finishes.<sup>19</sup> The rapid temperature rise within the compartment and failure or absence of protective structural coverings results in the potential for growing structural involvement and fire spread at or near the time of the firefighters’ tactical intervention.

18 ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials and CAN/ULC – S101 Standard Methods of Fire Endurance Tests of Building Construction and Materials

19 The real fire development data stops at 20 minutes because the thermocouples (temperature measuring devices) have failed due to failure of the drywall ceiling assembly to which they were attached.

A 2004 technical study conducted by the National Institute of Standards and Technology (NIST) indicated that fires smoulder longer, and then burn hotter and faster than what was typical when smoke alarms were first introduced in the 1970's. The NIST study also concluded that because fires could be more aggressive, the time needed to escape some types of fires has been reduced from approximately 17 minutes to as little as three minutes in certain situations.<sup>20</sup>

In 2007, Underwriters Laboratories (UL) and the Fire Protection Research Foundation (FPRF) completed the Smoke Characterization Project, releasing extensive quantitative data and analysis that expanded on the previous NIST study. The Smoke Characterization Project found that modern fires are chemically different and highly complex depending on variable factors such as how the fire ignites, fuel type and geometry, air movement and compartment size.<sup>21</sup>

The compartment size in the case of Forward Avenue was initially a two storey single residential occupancy within Building 1 until spread of fire to the exterior balcony (an arranged geometry) by failure of a window or door. Ultimately, smoke (pyrolized fuel) and open flame (ignition source) spread fire to the roof spaces (compartments) and other balconies of both Buildings 1 and 4 and back into other rooms (compartments) within the respective structures. Simply put, the combination of fire, combustible contents and structure and the geometry of the buildings created conditions for rapid fire growth and spread throughout the buildings.

The progression of this fire as with any fire may be modeled and the description of its progression above is just that, a model. It is in the comparison of the model with photographs, observations and oral reporting that one may begin to understand the growth of this fire, understand its magnitude, the conditions encountered by the first arriving companies and possibly evaluate tactical actions and their impact on fire growth and control.

This fire poses additional challenges to understanding or modeling in that both the wind (20 to 26 km/h blowing directly into Side 1) and the cold air created significant differentials in the "ventilation profile"<sup>22</sup> (air/smoke/fire flow) that created, along with other factors, conditions ripe for a "high intensity fire"<sup>23</sup> (large fires involving multiple residences).

High intensity fires are becoming more prevalent due to the aforementioned fire factors and such issues as building design, site plan arrangement, building density, spatial separation and combustible construction finishes. Previous OFS fire experience and more recent research has demonstrated how these fires develop and their destructive impact on construction materials in residential buildings.

Unfortunately, education, developmental training, pre-plans, alternative tactics and tools, building codes, Public education, and legislation have not kept pace with the identified changes and the fire service is forced to rely on strategic and tactical models that may not fit the operational reality.

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20 Building and Fire Research Laboratory, *Smoke Alarm Tests*, NIST TN 1455, 2004

21 Fabian, Thomas, R., Ph.D., and Gandhi, Pravinray, D., Ph.D., P.E., Underwriters Laboratory Inc., April, 2007

22 *Definition of Ventilation Profile, FF Tactics Under Wind Driven Conditions*, Fire Protection Research Foundation, April, 2008.

23 Richardson K., *Fire Safe Homes: A National Issue, the Calgary – Ottawa Protocol, Discussion Paper*, December, 2007.

Many OFS personnel would not be able to define or communicate the variables identified in the previously cited fire behaviour studies nor distinguish between fires that are ventilation controlled versus fuel controlled. While not being able to articulate the factors affecting fire dynamics; those same firefighters may be able to assess fire conditions and select tactical options by visual reference to an internal pattern as identified in the section on RPDM.

The selection of tactical options is largely dependent on the point at which the fire service intervenes. OFS, like other large municipal fire services, employs an aggressive or assertive tactical philosophy that involves ventilation, entry, search for victims and extinguishment at or near the peak of fire development. Typical OFS response time to intervention ranges from four minutes to six minutes in the urban core and up to fourteen minutes as one radiates out into the rural sectors.

Regardless of affiliation (Urban/Rural) modern fire dynamics research should dominate planning and evaluation to response. Response time factors such as efficient communications, call volume, route impediments such as construction and traffic, vehicle placement, and vehicles out of service due to maintenance requirements, training obligations and staffing shortages will dramatically effect fire growth, public and firefighter safety.

“Intervention involves assessing the relative danger to firefighters and assigning appropriate tasks to control the emergency.”<sup>24</sup> The assessment of relative danger to OFS firefighters (Risk) and the assignment of tasks are weighed against benefits to society (Gain) using direction from SOP FI 03.1-2003 Incident Management System. Specifically, under the heading of Tactical Priorities (italicized below) it states:

*Tactical Priorities*

*Tactical Priorities must be addressed in priority order. It is understood that the following 3 points reflect the priorities of the incident.*

*The IC focuses available resources on the highest priority until that priority is completed or until there is no reasonable expectation that it can be achieved.*

***Life** Rescue persons, remove endangered occupants and treat the injured.*

***Incident** Control / stabilize the incident.*

***Property** Conserve property and protect the environment*

SOP FI 03.1-2003 Incident Management System further advises the command officer that:

*Consideration for the safety, accountability and welfare of all personnel at the scene is most important, and must be ongoing throughout the incident.*

And that Risk Assessment and Management Principles shall form the basis of tactical decision making at all levels:

*Risk Assessment and Management Principles*

*The Incident Commander is responsible for Risk Management in the determination of Tactical Objectives.*

*Risk Management Principles shall form the basis of Tactical Decisions at every level of the Incident Management Organization.*

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24 Cole, William D., submissions before Arbitrator Martin Teplitsky in *Ottawa Professional Fire Fighters Association and the Corporation of the City of Ottawa* (unreported, September 1994)

*The guiding Risk Management Principles are:*

- *Activities that present a significant risk to the safety of personnel shall be limited to the situations where there is the potential to save endangered lives.*
- *An inherent risk to the safety of personnel is recognized in activities that are routinely employed to protect property. These risks shall be recognized and actions shall be taken to reduce or avoid them.*
- *No risk to the safety of personnel is acceptable when there is no possibility to save lives or property.*

Life as the priority for both the firefighters and the public served is not in dispute.

The workers' objection stems from the understanding and characterization of their actions by management as inconsistent with past practices and received training with respect to risk management outlined in SOP FI 03.1-2003 Incident Management System.

Further, it is the Workers' Representatives' opinion that the risk management requirements are onerously applied when the Incident Management Objectives (italicized below) detailed in SOP FI 03.1-2003 Incident Management System are met mostly in the fixing of responsibility but rarely in provision of operational supports to enact and utilize the system at escalating events.

#### ***Incident Management Objectives:***

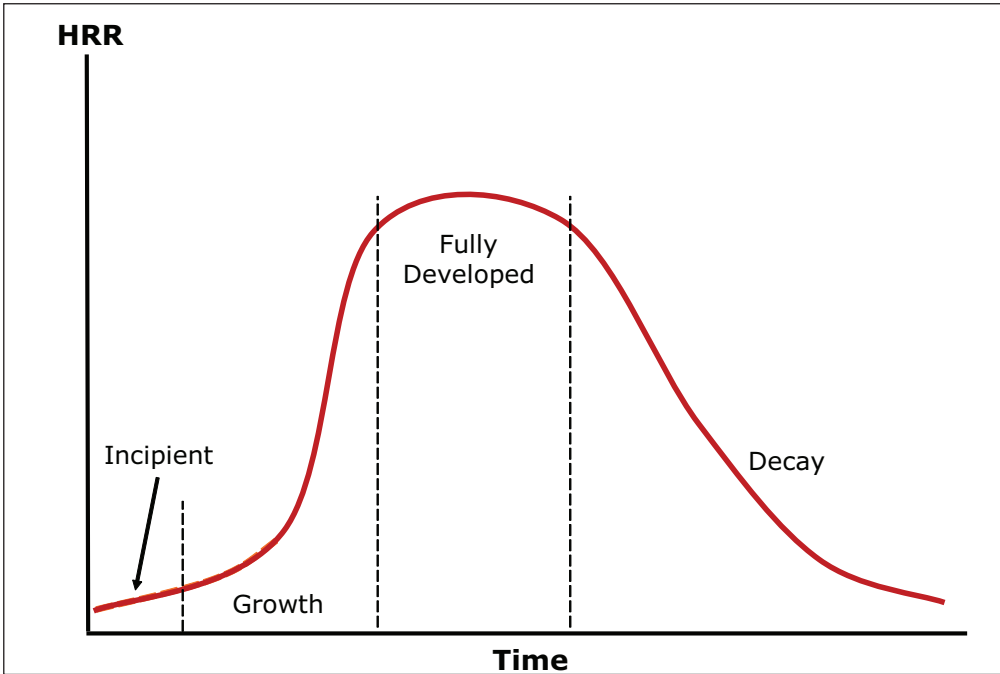
*The objectives of the Incident Management System (IMS) are to:*

- *establish an effective and functional organizational structure outlining the management of personnel, resources, activities, and responsibilities at an incident;*
- *ensure that a strong, direct and visible Command is established as early as possible in the operation;*
- *fix the responsibility for command of the incident on a specific Ottawa Fire Services individual depending on the arrival sequence of personnel;*
- *provide a process for the orderly transfer of command to subsequent arriving senior officers;*
- *provide a system to process information, which will support Incident Management, planning and decision-making*

#### **Assessing Risk**

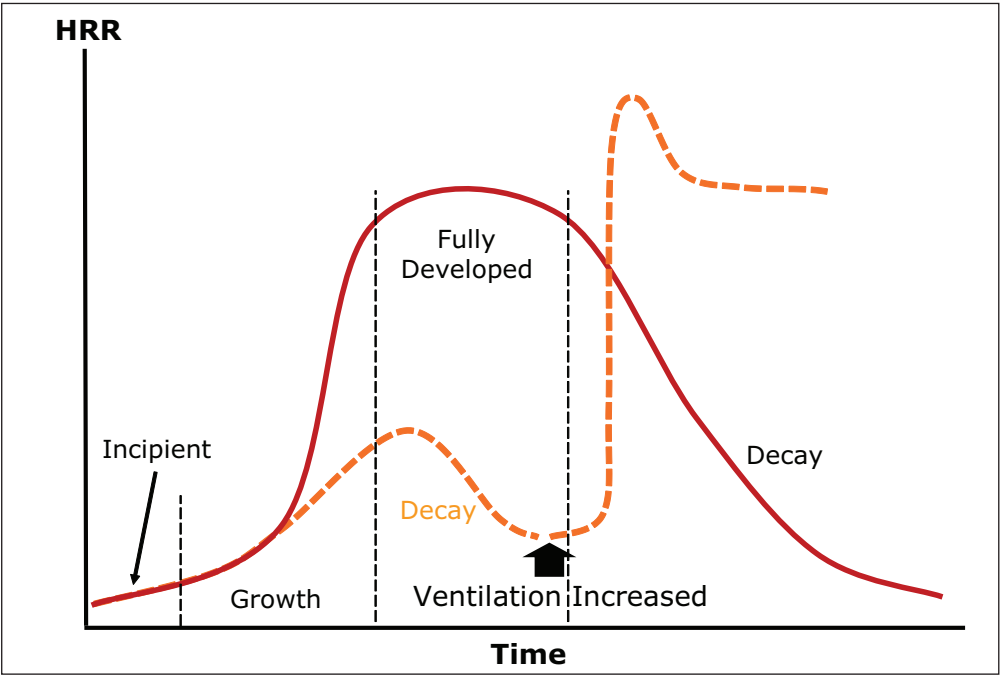
The last objective outlined in the previously noted list is critically dependant on risk evaluation. The evaluation of relative risk is formally identified within the IMS procedure but is not formally taught nor can it be without first having developed in the workplace an understanding of modern fire dynamics (Theory), development of evaluative knowledge (Building Construction and Tactical Considerations) and skills ("Reading the Ventilation Profile"), and practical training with live fire (Compartment Fire Behaviour Training).

Figure 2 illustrates the current thinking of most of our fire personnel regarding the development of fire. This classic model shows a predictable fire progression and behaviour. The Heat Release Rate ("HRR") is progressive in time. This model is accurate if one is dealing with a laboratory test cell fire or more reflective of fire development associated with natural or Class A combustibles. This is the model currently being taught to recruits and upon which intervention and safe activities are evaluated.



Derived from figures by Lars-Göran Bengtsson (Sweden)

**Figure 2: Fire Development Classic Model**



Derived from figures by Lars-Göran Bengtsson (Sweden)

**Figure 3: A more typical fire development - orange dotted line.**

Figure 3 illustrates the more typical fire development (orange dotted line) superimposed over the traditional model of fire development (red solid line). Today's fire typically grows until checked by availability of oxygen and the early decay creates a tremendously dangerous condition.

The heat of the fire and smoke continues to decompose (pyrolyze) more fuel. The predominant fuels are plastics that have lower decomposition and ignition temperatures and higher fuel density than traditional combustibles. When this fuel becomes entrained with air (Figure 3 - Ventilation

Increased) and an ignition flame is re-established from a smouldering condition, rapid fire progression begins. It is instantaneous, extreme, and has a peak HRR above and beyond the classic model.

Numerous LODD<sup>25</sup> investigations have identified this kind of extreme fire behaviour as a contributing factor to firefighter fatalities. Interestingly, the survivors of this event describe it as having occurred without warning or beyond the scope of their understanding. In the wake of the LODD reports and survivor comments, we are left to ask the question; “Why would fire fighters not understand modern fire behaviour?”

The question is rhetorical and reflects the fact that the North American Fire Service continues to rely upon a fire behaviour model that has long since been found to be wanting given the fire environment regularly seen at fires today. We observe that, despite the availability of the most recent data on fire behaviour, understanding of material science and its implications for content and structural involvement, our firefighters rely on strategic and tactical guidance that predominantly evolved from outdated models.

The accumulation of operational reporting has long identified these issues within the fire service. Today we have empirical proof of modern fire development and a better understanding of how crisis decision making is facilitated and what informs those decisions.<sup>26</sup>

The Workers’ Representatives have identified significant gaps in knowledge and understanding with respect to the modern fire environment and behaviour. The following recommendations are made for corrective action.

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25 Mora, William, *U.S. Firefighter Disorientation Study 1979 – 2001*, San Antonio Fire Department, July, 2003

26 Burkell, Charles, J., and Wood, Hugh, *Make The Right Call*, Fire Chief Magazine, March, 1999



## Recommendations

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### *Fire Behaviour*

It is recommended that:

- OFS develop, implement and maintain a comprehensive fire dynamics course for all operational personnel.
- OFS contract with a forensic engineering firm or Fire Protection Engineering graduate students to develop a Fire Dynamics Simulation (“FDS”) of the Forward Avenue fire and report on the critical factors in the initiation, growth and spread of this fire.<sup>27</sup>
- OFS integrate the Forward Avenue fire FDS into the fire dynamics course to develop and enhance operational assessment skills and evolve consensus strategic and tactical approaches based on identified critical factors within the FDS.
- OFS instructors undertake Level I and Level II Compartment Fire Behaviour Training (“CFBT”) in order to deliver it within the department.

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<sup>27</sup> National Institute of Standards and Technology (“NIST”) has developed a FDS fire modelling program and the results can be viewed as 3-dimensional animations that can show differences in fire behaviour based on changes in such things as wind or ventilation openings.



# Training

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The Training Division both pre-amalgamation and post amalgamation has been an administrative and special projects support unit to the Fire Management Team (“FMT”).

Historically, persons who entered the division as training officers would, by virtue of their skill sets, be reassigned to the most pressing administrative challenge or program as there were no other day staff from which to draw upon. These staff draw downs or reallocations left the division without staffing resources to develop, implement or maintain critical training programmes.

An unintended consequence of the repeated staff draw down was the creation of conflicts with respect to training capacity and operational needs. The administrative and special projects, while important to the department, created the staffing conditions whereby only recruit or legislated training can be delivered at the expense of a comprehensive continuing education program on basic and advanced firefighting skills along with company and chief officer development programmes.

Recently, officer development has centred on administrative duties (Media Relations, Progressive Discipline, Communicating for Results, and Managing for Optimal Performance) all of which is delivered outside OFS by Corporate Training. Additionally, a few chief officers have attended Basic Emergency Management and Emergency Site Management course offerings from the Federal Emergency Preparedness College. This training is important but it fails to address the outstanding firefighter, company and chief officer operational (task, tactical and strategic) development needs.

The operational view (subject matter experts) of what was needed and what is being delivered sets the stage for dysfunction as relationships necessary for information transfer and training delivery are not realized.

The issue of staffing, administrative reassignment and dysfunctional relationships persist today for the same reasons and is at the heart of our lack of capacity to develop, implement and maintain fire operations training.

In addition, the advent of Special Operations (e.g. Haz-Mat, Technical Rescue, and Water Rescue) and the allocation of resources to these programs away from the Training Division have amplified the problems.

Coupled with these organizational issues, Operations is limited in its capacity to conduct multi-company drills and fire specific training due to staffing, special ops training, public awareness (Wake Up Ottawa) and/or use of the Industrial Road site by recruits or outside entities.

The current facilities do not have year round indoor capability for all forms of operational training nor is there a dedicated site for a full Compartment Fire Behaviour Training (“CFBT”) program which is critical to operational safety.

CFBT integrates the topics of fire behavior, fire streams and ventilation within a structural firefighting context. Safe and effective structural firefighting operations require:

1. A solid understanding of how a fire develops within a compartment or structure.
2. The ability to “read” fire behavior indicators.
3. Knowledge of how tactical operations will influence fire development and the environment inside the building.
4. A high level of skill in the application of these concepts.

Often the topics of fire behavior, fire streams, ventilation, structural firefighting tactics, and live fire training are treated as related, but independent topics within fire service training. CFBT provides an integrated framework for developing structural firefighting knowledge and skills.

While CFBT programs vary in duration and specific content, they generally integrate the following topics through classroom and hands-on training: Basic Fire Behavior, Fire Development in a Compartment, Extreme Fire Behavior, Fire Behavior Indicators, and Fire Suppression and Ventilation Tactics<sup>28</sup>.

These systemic issues must be addressed if we are to progress. Post Forward Avenue the Training Division has attempted to deliver Building Construction and Reading Smoke courses to the Suppression Division based on repeated recommendations contained in reports by the Safety Division.

The two courses were delivered in station to all platoons in approximately 9 hours. The original building construction course was 40 hours in duration, cut to 32 hours based on a delivery window of the 4 day suppression shift and compressed to 6 hours for in station delivery. Similarly, the Reading Smoke course is a full 10 hour course that was delivered in 3 hours.

Both courses are examples of how training on subjects that are critical to fire ground information gathering and analysis are regularly delivered. This reflects the extreme dysfunction of the system whereby foundational information is delivered in a manner to meet schedules and benchmarks as opposed to actual training for retention, recall and operational refinement.

Occupational Health and Safety Training for Supervisors and Managers is another example of these practices. This two-day course offered via the Corporation for supervisors and managers was delivered to OFS personnel as a one-day course.

Given these experiences one is left to conclude that these specialized courses are delivered in abridged forms for the administrative convenience of reporting their delivery in the place of serious investment in education and advanced skill development.

Many suppression personnel identified the delivery of this training as a repeated demonstration of the lack of understanding and substandard response to the needs of operations. Recently, another training effort has been underway that practices hose evolutions for advancing lines on a fire. The training is mandatory for all Platoons and directly overseen by a District Chief to ensure compliance with the procedure.

The training involves a single company advancing a charged hose line to the second floor and requires that the line be charged in the street and then advanced to the objective. The procedure is ideal for a residential single family home if you have three firefighters advancing the hose line and only one change in direction is encountered in the advance to the second floor.

Knowledgeable firefighters understand that the attempt to ingrain the procedure is a genuine desire to keep people safe, but, they also recognize that the procedure is limited to the above noted single family occupancy fire incident. Many of our experienced officers are of the opinion that the practice will become the procedural rule for all fires based on a position of liability, not operational reality or industry practice.

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28 Grimwood, P., Hartin, E., McDonough, J., & Raffel, S., *3D Firefighting: Training, Techniques, and Tactics - What Is Compartment Fire Behaviour Training?* May, 2005

Advancing a charged hose line to the fourth floor of a dwelling from the street with four or five changes in direction is not practical and could be tactically dangerous as a single company action (fire development vs. line deployment time). Tactically the four storeys requires at minimum two companies for the single line deployment from the street.

The operational hose line training does not offer tactical context, only mandatory action, which is in all but the rarest of occasions not practical or achievable when operating in any structure other than a bungalow or simple two storey home as a single company.

If this is to be the mandatory procedure and is “agreed” to by all officers in the *Progress Tracking Report - Recommendations - 187 Forward Avenue* provided by FMT as part of their follow-up reporting to the MOL on corrective actions - the employer must provide the workers with contextual training and written tactical guidance.

One of the unfortunate realities in the fire service is that by our nature, we take great pride at coping with adversity. We’ve learned to put out fires with chronically understaffed trucks. We often make up for lack of equipment with our own ingenuity.<sup>29</sup>

Fire fighters by their very nature are people who are stimulated by a challenge and regularly tested in their ability to adapt and overcome problems. They evaluate those adaptations and disseminate them as institutional information that is passed on experientially or through oral tradition.

Amalgamation and modern fire service delivery has brought many changes and coupled with those changes is a pressing need for sound education as opposed to relying on experience for operational training. Coping with modern fire problems and services cannot be left to ingenuity alone, planning and sound investment must lead.

It would be inconceivable today to allow a police officer to attain or retain weapons qualifications without significant practice, small and large event simulation and annual requalification.

OFS personnel must be afforded the opportunities for and access to realistic fire training, company and chief officer development courses and medium to large scale integration exercises. Change and the need to manage its effects within the training environment require training resources and facilities directed beyond fire fighting recruit school needs.

An observation made as early as 2004 and set out above under the section on Change, warrants repeating;

*“Mitigating the effects of these changes and developing an experienced operations culture in today’s fire environment as well as other response types will take many years of careful planning, comprehensive training programs and a systems approach to risk management that is directed at the needs of operational safety.”<sup>30</sup>*

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29 Varone, Curtis, *Command’s Right Hand Part 1*, Fire Chief Magazine, March 2000

30 OFS Safety Division Business Case: *Recommendations for Improved Operational Safety*, August, 2004

The Workers' Representatives find significant dysfunction with respect to design implementation and delivery of firefighting training at all levels with the OFS. The following recommendations are made for corrective action.

## **Recommendations**

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### ***Training***

It is recommended that:

- OFS properly staff and resource the Training Division to develop, implement and maintain training programs in all the emergency disciplines.
- OFS engage subject matter experts in all phases of program development wherever possible.
- OFS ensure a Workers Health and Safety Representative is included in the make-up of the Urban Training Consultation Committee.
- OFS develop, implement and maintain curriculum directed at firefighter, officer and chief officer development that encompasses knowledge (theory), skills (application) and abilities (evaluation) in its design.
- OFS companies be evaluated quarterly on their abilities to perform a series of standard functions as defined by the relevant SOPs.
- OFS conduct multi-company exercises on a quarterly basis.
- OFS conduct annual multi-company, multi-discipline city wide exercises
- OFS undertake a feasibility study for the construction of a new purpose built, all season, multi-discipline training facility.
- OFS integrates Level I and Level II Compartment Fire Behaviour Training ("CFBT") within structural firefighting operational training
- OFS immediately discontinue the practice of delivering abridged versions of training courses.
- OFS undertake a comprehensive review of all current fire suppression training materials and courses to establish their efficacy with respect to procedural context and operational realities.
- OFS Training Officers be afforded opportunities to return to operational roles to evaluate efficacy and relevance of training programs as part of a quality control process.
- OFS develop, implement and maintain a searchable electronic training library and repository of technical knowledge.

### **Communications**

The capacity and capability to communicate crucial information has been identified as one of the leading life safety issues during fire emergencies.<sup>31</sup>

Safe and effective emergency communications requires a reliable, robust and scalable communications system. The scope of this section is directed at ensuring that previously reported safety concerns and/or recommendations before the Communications Committee are evaluated and acted upon in a timely manner.

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31 *Firefighter Fatality Investigative Report, Sofa Super Store, Post Incident Assessment Review Team, Phase II Report, May, 2008*

## **Staffing**

On any given day, the Communications Centre may have up to seven and sometimes more staff on duty. Despite the employer's best efforts to meet target-staffing levels of five, it is not uncommon to having staffing levels of four due to leave requirements and a hiring freeze. The under staffing practices and the subsequent overload created by a major emergency, similar to Forward Avenue, can easily overwhelm the Communications Centre even when the mandatory minimum of five are on duty.

One must keep in mind that while a major emergency is being handled by the Communications Centre staff; other emergencies continue to occur and require full attention. Moreover, a major fire is typically reported by multiple callers – it is not uncommon for the fire dispatch centre to receive dozens of telephone calls from members of the public, each reporting the same incident – all of which must be answered and evaluated.

OFS Dispatchers are typically dedicated to a fire call of 1<sup>st</sup> Alarm or greater or any significant event. This necessitates the Dispatcher so assigned to hand off all other duties to another Dispatcher who may now have five channels to monitor and control.

When under staffed the Dispatcher may lose situational awareness given the multiple inputs, handling multiple incidents, or being left alone to handle a complex incident may impede or even exceed the Dispatcher's capacity to prioritize and manage the span of control and thereby reduce the critical incident communications oversight.

Other assistance calls, emergencies and associated telephone and radio communications create system stress that goes unrelieved and impacts the effectiveness of the Centre. Breaks for decompression, nourishment and bodily functions are rushed or unavailable. If left to continue the stress results in a significant health and safety risk for both on scene operatives and staff within the Communications Centre.

The Supervising Dispatcher is then forced into the task level of dispatch to ensure effectiveness of the centre during the incident. The supervisor is torn between the requirements to manage the system and execute tasks. The reduced staffing results in the safety oversight and scalability of the system being lost. A minimum of six is required to operate the system and to ensure critical safety oversight.

## **Preplanning**

At amalgamation many of the municipalities had accumulated detailed information on civic addresses within their jurisdictions. Typically, the information was organised in each Department's computer aided dispatch ("CAD") system by sub-headings like construction, occupancy, protective features and exposures (life and property). This collected information established a safety or annotated needs profile for the dispatcher and responders.

Post amalgamation this "legacy knowledge" was not transferred into the new CAD system due to costs or technical challenges or both.

In July 2006, there was a multiple-alarm fire at 217 Forward Avenue (Exposure 4A - which is part of the same Community Housing complex). Remarkably the experience of that fire and any post or pre-incident survey information on the buildings does not exist within the current system nor does the system have the capacity for its entry.

There has been a generational loss of legacy knowledge due to the current system configuration and the lack of a robust reporting tool. Simply stated, thousands of person-hours of information gathering and input from pre-amalgamation departments are lost to the new Ottawa Fire Service for want of a system that could import such data.

The current “Wake Up” Ottawa program addresses an important public safety information need but, could equally allow for pre-incident survey information collection to enhance dispatch information if the system could support the data. Unfortunately, eight years since amalgamation - this is not the case.

### **Digital Data Logging**

Radio logs from the PANDA data recorder raise serious concerns with respect to accuracy and security of the data. The logs provided to the Association investigating team have persons reporting the fire at 11:40:58 and 11:51:20 hours. The receipt of alarm based on apparatus response was fixed as 12:28:05 by the team and we believe the sequence of events are correct but, question how the recorded data could be so out of sequence.

The issue of time stamp and data accuracy has tremendous implications for provenance of events and actions by OFS personnel and for other aspects of risk management associated with the provision of emergency services by the Corporation.

### **Channel Allocations and Lack of Hardware**

The following is taken from the Forward Avenue Audio log...

12:42:59

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Operation calls Command and gives an assignment update.

Pump 11A Fire is Attack and Pump 13A assigned to Search and Rescue.

12:43:19,

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Command acknowledges the assignments.

12:43:22

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**Pump 11B Officer** calls from inside the building of origin.

**“We are in trouble...trapped on the first floor... get some doors and windows open”**

The call from Pump 11B Officer in not responded to.

**Note:** Hot zone committed crews are operating on the same channel as all other units both those responding and on scene. Pump 11B crew’s lives are in danger and no one has acknowledged their transmission. The one channel is busy and the situation is escalating with all sectors competing for air time on this one channel.<sup>32</sup>

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32 NFPA 1561 requires “one radio channel for dispatch and a separate tactical channel to be used initially at the incident” [6.1.1]



12:43:39

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17 seconds after the call for help, Operations calls Command seeking a Third Alarm and is acknowledged at 12:43:42. Command seeks the next pump coming in at 12:43:44 and Dispatch identifies Pump 22 as next in at 12:43:49.

There is a gap in communications as the static of an open microphone (transmitting) begins to interfere with radio communications. Dispatch identifies a “Man Down” alarm as portable radio # 9485. Fire Fighter CARON calls Command to identify that we have a man down as Fire Fighter CAMPBELL is now in the parking lot having jumped from the fourth floor.

The remote microphone on the radio, belonging to an interior crew member, has sustained damage from the intense heat and this is believed to have activated the man down system – the radio channel is no longer available for use until the man down has been cleared.

12:45:00

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(1 minute, 38 seconds later) Command calls Dispatch and requests ambulance staff to attend as a firefighter has come out of the top floor window.

At this point, almost 3 minutes later, Dispatch identifies to Command that the “Man Down” alarm is from 11B Officer (portable radio # 9485) at 12:46:00. Dispatch calls again seeking confirmation of message received. Dispatch calls again at 12:46:08 to identify a second “Man Down” alarm as portable radio # 9616 (Pump 11A crew).

The communication staff is incredibly busy and one of the staff (typically the Supervisor) has looked up the Logical Identification Display (“LID”) number to determine whose “Man Down” alarm has been activated. The Supervisor may in fact be engaged at the task level on a separate 911 call that cannot be dropped creating operational conflict.

The transcript further illustrates the communication difficulties encountered by fire fighters when dealing with limitations of the present radio system setup. Throughout the incident, radio messages became disjointed mostly due to the inability to attain air time or officers busy with assignments and missing critical transmissions.

With one fire ground channel in operation all users are competing for the channel. Those in peril or with urgent messages are competing with others less exposed. Better integration and coordination of activities is not possible when the channel is so committed.

The importance of having a tactical channel for those at risk and a general or response channel for those on scene or responding is critical to fire ground safety. (See Incident Command System – Communication System).

The worker group feels that all fire fighters on scene should have been equipped with portable radios for communications. While this issue remains important to the worker group, FMT feels otherwise and reasons their decision on the basis that teams of two sharing one radio satisfy the communication requirement.

The requirement of all firefighters working in pairs is a sound and recommended approach but rarely is it possible given the limited availability of staff resources and protocol requirements identified in OFS SOPs. Experience has demonstrated that two rescue workers sharing a radio is

neither sufficient nor is it safe since workers are often separated completing necessary task level assignments as was demonstrated at the Forward Avenue Fire.

Over one year later, there is no tactical radio channel protocols nor sufficient portable radios to ensure fire fighter safety. As can be seen in this incident Fire Fighter CARON had a radio and used it to signal for help through activation of his man down function to seek assistance for Fire Fighter CAMPBELL. What if the person with the radio is incapacitated and can't signal for help?

### **Command Aids and Decision-Making**

OFS has been evaluating Mobile Data Terminals ("MDT") for use by Commanders. The MDT offers enhanced communications and data management capability for use in the command environment. The implementation of this technology is intended to improve operational efficiency and reduce the distractions that can impair command decision-making.

Careful consideration must be given to the impact any tool or procedural change may have on crisis decision-making and that change must be properly supported with extensive input from users so as to ensure the change maximizes benefits and minimizes impediments and/or disruptions to our command officers.<sup>33</sup>

### **Communications Committee**

FMT created a Communications Committee over three years ago. It has the mandate to research issues, concerns and deliver recommendations to FMT to improve radio communications for the OFS.

The concern, despite issues being raised and identified to this committee and FMT, little is being accomplished, changed or witnessed by field operations.

Communications during emergencies is critical to successful outcomes and it is the Workers' Representatives' findings that the following recommendations are made for corrective action.

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33 Varone, Curtis, *Not Your Father's Command Post*, Fire Chief Magazine, August, 2001

## Recommendations

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### *Communications*

It is recommended that:

- OFS establish a minimum staffing level of six personnel at all times in the Communications Centre.
- OFS explore the ability to add and modify fields within the existing CAD system in support of descriptive building terminology, pre-incident plans and premise history.
- OFS adopt a radio communications model predicated on a combination of citywide response channels and dedicated tactical fireground channels.
- OFS provide a portable radio to all personnel operating at emergency incidents.
- OFS reinforce standard radio terminology usage with all users.
- OFS establish written operational procedures for the roles and responsibilities of OFS personnel in the response and management of a distress (“MAYDAY”) call.
- OFS confirm the provenance and security of the PANDA data-logging computer.
- OFS ensure end users, prior to adoption and implementation, comprehensively test command aids.
- OFS ensure command aids are supported in their implementation by training and field audits.
- OFS develop, implement and maintain a pre-incident planning program.
- OFS ensure a Workers Health and Safety Representative is included in the make-up of the Communications Committee.
- FMT ensure that the Communications Committee act in a timely manner with respect to recommendations and decision-making.



# Incident Management System (“IMS”)

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## Background

The Incident Command System was adopted in various forms by the former municipalities in the late 1990’s. The Ottawa Fire Department (“OFD”) implemented the command system in 1997. Training consisted of a written précis and two days of classroom study. During the OFD implementation phase it was widely recognized that the transition to the new system would result in operational problems.

Following the amalgamation of 9 Municipal Fire Departments in 2001 a new Incident Management System was formalized and promulgated through a series of SOPs. In the fall of 2001, a review of the High-rise Command Procedures was conducted due to significant dysfunction during multi-company response to both commercial and residential high-rise fires.

Since 2001, the incident command system has been adopted with subtle interpretive variation by the four platoons and the four rural sectors. Recent training has been directed at company officers through a slide show review of command and task assignments to the first three responding apparatus using the Urban Tactics documents. This training has not been completed across all Platoons due to other priorities.

The key command problems during operations are due to the lack of standardized developmental training and operational implementation, system design and the radio communications model evolved during Amalgamation. The following is an examination of these factors:

## Developmental Training and Operational Implementation

The Command System is predicated on, as the name implies, a systems approach to managing diverse incident activities. The system’s first and foremost purpose is firefighter safety. Knowledge of the system is based on self-study, practical training exercises and operational experience in use.

Operational experience in use is limited and practical training exercises to date have been very limited and markedly different amongst the Platoons. Self-study of the subject assists in understanding the concepts and nomenclature but it does not develop operational familiarity (RPDM) and results in interpretive application.

It is this lack of operational familiarity with IMS, coupled with our systems’ design and radio communications model that result in ineffective or dysfunctional Command during large-scale events.

## System Design

The OFS Command System, SOP F103-2003 – Incident Management System, clearly identifies the strategic, tactical and task level organization required for response safety. In practice the required organizational structure is consistently not implemented due to the lack of a Command Aide.

The application of our command system and its intended goals with respect to firefighter safety is critically dependant on a Command Aide position that is not staffed.

The Incident Commander’s Aide is widely recognized throughout the fire service as essential to effective and safe Command Post operations. The Aide, in addition to response driving, is responsible for the task-level management of tactical worksheets and status boards, recording

company assignments and establishing accountability, all non-tactical communications, data terminal use on scene, reconnaissance and other duties required by Command to manage the incident.

Command without an Aide results in missed strategic opportunities, tactical errors, loss of accountability, poor tactical control of the radio channel(s) and clearly has the Chief Officer preoccupied at the task level which compromises operational safety.

Being too busy to maintain situational awareness places commanders in the position repeatedly noted as a hallmark of operational dysfunction and a leading contributing factor in the cause of injury and death within the fire service<sup>34</sup>.

Aides can keep the IC from losing situational awareness and free up the IC's attention so that he or she can concentrate on more critical matters.

OFS Chief Officers have long recognized the requirement for a Command Aide and in an effort to cope with an excessive span of control an additional Chief Officer is typically assigned to function in the role of Aide (task level). This assignment is always delayed in its implementation and conflicts with our Incident Management System SOP which states under the heading:

**6.0 Command Organization**

*The Command organization must develop at a pace that stays ahead of the tactical deployment of personnel and resources.*

The assignment of a Chief Officer to the position of Command Aide is a misapplication of operational experience and needed guidance at the sector level. Chief Officers should, by their experience, knowledge, skills and abilities assume the role for supervision (tactical level) of the sector duties/ assignments within Hot Zones within an expanding system, not the command aide.

Additionally, the allocation of Chief Officers as aides negatively impacts the effective response and command oversight of other concurrent events.

The current model is further compromised at the sector level in that our apparatus are staffed with working supervisors (Captain/Lieutenant/Senior Man) who when assigned to a sector position are truly not supervising the operation as Sector Officers (tactical level) but, operate as working supervisors (task level) given their company-level duties.

This is not to say that company officers cannot assume the sector position, but they must not be functioning at the task level. Engaging in physical tasks is inconsistent with the expectations of the tactical level supervisor and creates a gap in command oversight of the tactical sector which in turn causes loss of situational awareness both tactically and consequently strategically.

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34 Moore-Merrell, L., IAFF Redmond Symposium, *Contributing Factors To Fire Fighter Line-Of-Duty Deaths*, 2008

## **Communications System**

The command system by its design places a communications order model on response incidents (Strategic/Tactical/Task) and with our communications system that is based on a district model of communication (1.1, 2.1, etc.) we have severely encumbered the Command officer in the fulfillment of his/her primary responsibility, which is the safety of response personnel.

Chief officers should, at the receipt of alarm, be conducting a mental size-up of the reported condition, confirm response and monitor first in assignments and conditions while responding and on arrival should be conducting a size-up, assuming command and directing at the strategic level.

Currently, Chief Officers must monitor radio and cell phone communications under response driving conditions at high speeds to buildings in districts they may be unfamiliar with and without GPS or computer assistance as to building pre-plans. Then upon arrival commence size-up, establish tactical worksheets, monitor and communicate with companies tactically engaged along with incoming companies and the Communications Centre.

All of these task level actions must be undertaken while trying to impose strategic and tactical order to a fast paced incident that is escalating.

Command officers should on arrival be directing their attention to the safety of those in the Hot Zone and their respective supports through a communications model that has the fire ground on an assigned frequency (tactical channel) and all other communications (Dispatch, responding units etc) on a citywide channel.<sup>35</sup>

The current model results in radio crowding at escalating incidents as well as minor ones, which has consistently been a safety issue in that command officers are impeded in communicating with company officers during search and rescue operations, urgent calls and Maydays.<sup>36</sup>

Together, these deficiencies place a burden on command officers that forces them to operate at the task level without the benefit of critical information in the development of strategy and execution and revision of the plan of operations. Without this information command relies on an experiential knowledge that may not fit with the fire ground reality or our command system.

### **Accountability (Fire Fighter Accountability and Scene Tracking (“FFAST”) system [SOP 0200-0005]**

The FFAST system is rarely implemented in a timely manner when confronted by large or rapidly evolving events. Under-resourced responders must divert the assigned company to other critical functions or the delay in arrival places FFAST out of pace with the event. The SOP directing its use imposes an unrealistic expectation that creates by its design failure to perform.

Pump 23 (Capt. B. WARREN) was dispatched as the FFAST resource company. In Captain Warren’s report he relates that his first actions on scene are to ensure additional water supply to Pump 11A per orders of Command and then two of his members are diverted to an exposure line on Side 2. While heading to the Command Car to get and set up the accountability board, man-down alarms are heard and Pump 11B crew members are jumping from the building. Capt. Warren states: “With the rapid growth of this incident I was unable to get accountability working properly at this call.”

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<sup>35</sup> “Supra” Note 24

<sup>36</sup> NFPA 1500 identifies the responsibility of the Incident Commander to “Initiate, maintain, and control incident communications” [8.1.8 (4)]

Crews were working remotely from the accountability location and there was no one to collect passports except Capt. Warren who, as the Accountability Officer, should not have been operating at the task level in the setup of the board and collection of 11 Unit's passports.<sup>37</sup> Communications between crews entering the Hot Zone and Accountability was nonexistent which escalated the loss of awareness and conditions faced by command and deployed resources.

The system, prior to its physical establishment, is dependant on a Command accounting that consists of a request from Command or identification from Dispatch of a list of apparatus on scene or responding. This approach is fine if there is no rapidly evolving event but, as has been repeatedly reported, fails in use when confronted by rapid growth of the incident. This failure places undue expectations on the Command officer and by design creates failure to perform.

*At 12:35:02 Pump 13A books on the air responding. Command requests additional responding apparatus to stage on Lyndale Avenue. Dispatch provides Command with a response line up of Pump 23 (assigned as Accountability) Pump 13A (assigned as Rapid Intervention), Safety Car 23, Rescue 12 and Car 20 and queries Command for any additional rig requirements at 12:35:48.*

*Command responds that "we have a second response" ... "have we got a second aerial coming?" Dispatch responds in the negative. At 12:36:13 Command requests the 2<sup>nd</sup> aerial and directs the apparatus to position at rear of the involved structures (Hinchey Street).*

An analysis of the italicized reference from the Sequence of Events section demonstrates the Command dilemma. Command states: "we have a second response" ... "have we got a second aerial coming?" The question to be asked is whether Command asking for a 2<sup>nd</sup> Alarm or does he believe one is already in progress? Why doesn't he know if a second aerial is on route? Why doesn't he know what aerial is next due?

The questions are asked rhetorically, because it is evident that Command is operating at the task level and valiantly attempting to develop strategic controls for the evolving rescues and evacuations, multiple fires, manage communications, and establishing apparatus assignments on scene and responding – Accountability.

The span of safe control has been exceeded.

Early incident operations and continuity of accountability is very much dependant on the Command Aide and efforts to make our accountability system more effective will not be solved without this critical position.

Command is a systems approach to managing fire and non-fire related emergencies and the absence of one or more elements of the system will result in dysfunction or complete breakdown. It is during this dysfunctional or breakdown period that a lack of familiarity with the command system, system design flaws and an inefficient communications model that the safety of personnel is compromised in direct conflict with the aim of the Systems.<sup>38</sup>

The following Workers' Representatives' recommendations are made to correct the identified deficiencies with the OFS Incident Management System.

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37 Passports are a key safety / accountability tool used to group, locate and account for deployed companies.

38 *Safety Division Report on Fire: 4<sup>th</sup> Alarm*, Incident # 07-49569, 801, 807, 809 & 811 Somerset Street West, 288 & 290 Booth Street, August, 2007.



## Recommendations

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### *Incident Management System*

It is recommended that:

- OFS develop, implement and maintain standardized incident management training for all users of the system.
- OFS Training Division be directed to include the concepts of Crew Resource Management as promulgated by the International Association of Fire Chiefs in the development of any incident management training program.
- OFS develop, implement and maintain the position of Command Aide.
- OFS establish preceptorship training for command officers through the Command Aide position.
- OFS develop, implement and maintain Incident Management Teams for use at large scale incidents or civic emergencies.
- OFS integrate the incident management system in all company, multi-company and city-wide training exercises.



## Ladder 11 – Fleet and Operational Issues

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(Power operated elevating device with ground ladders)

The employer's report on the evaluation of Ladder 11 is problematic in its conclusions. The premise of operator error limited the search for information that was consistent with the construct of the evaluation.

It is important for the reader to understand the history of ladder deployment throughout the city and the tactical roles assigned to ladder companies. It is only through such a comprehensive review that one can then evaluate Ladder 11's performance from its inception in the post amalgamation environment.

Response to fire requires concurrent and coordinated deployment of pump and ladder companies to be safe and effective. Not one experienced fire officer or fire fighter would contradict the previous statement.

This section of our Report will examine the context of its design, specification, acceptance testing, training, commissioning, and performance on scene and post fire as well as worker involvement throughout.

### **Ladder Needs and Context**

During amalgamation OFS undertook a realignment of apparatus as many of the newly amalgamated fleet vehicles suffered from disrepair or end of life cycle conditions. Inconsistencies in the configuration of elevating devices positioned after amalgamation has resulted in functional differences not sufficiently accounted for. For example, many elevating devices entered / remained in service despite having insufficient ground-ladder capabilities for safe and effective fire ground tactics.

The differences in ground ladder complements were a function of need within the former municipalities. The former Ottawa Fire Department required extensive ground ladders because building styles, fences or setbacks, urban density, hydro lines and old growth trees; all of which could severely limit powered ladder access during fire operations. In short ground ladders were a tactical necessity.

Conversely, the suburban and rural area fire services did not outfit their elevating devices with the full complement of ground ladders seen in old Ottawa, nor did they staff ladders to support the use of ground ladders and consequent tactics.

Evidence of the problems resulting from these poorly considered vehicle location assignments became clear at a number of large downtown fires. Command officers seeking tactical deployment of Bangor (50') ground ladders discovered that first due elevating devices were not outfitted with the high-reaching ladder. Coupled with the lack of ground ladders, command officers would be frustrated by the functional limitations of a number of elevating devices – the lack of flexibility in manoeuvrability of the power operated elevating device due to its type, size or stabilizer configuration.

These obvious functional shortcomings in the design and /or ladder configuration necessitated the dispatch of additional ladders into the downtown during the height of the fire. The consequence being delay, reduced tactical options for fire control and reduced coverage in other areas of the city.

These deficiencies and the need for Bangor ladders in the downtown were clearly communicated to FMT via Chief Officer's meetings.

## **Specifications**

Ladder 11 was built from a specification by OFS via Fleet Technical Services and Financial Services Unit. What informed that specification would only be speculative within this Report but what is clear is that the workers (subject matter experts) were not consulted. This lack of consultation is evident in the failure to properly outfit the apparatus with ground ladders (Bangor ladders) in the previous iteration of Ladder 11 and the subsequent equipping of the current Ladder 11 with a Bangor ladder at the expense of 35' ground ladders.

The 35' ground ladder is a standard piece of equipment within the downtown core and is referenced in the *National Fire Protection Association (NFPA) 1901 Standard on Automotive Fire Apparatus (2003), Section 8.7.1\* Ground Ladders*. The appendix further guides the reader to conduct an evaluation of need and offers a suggested complement of ladders which includes one 35' ladder.

What this illustrates is a lack of understanding of the needs of urban firefighting by the person(s) responsible for specification. Standard ladder complement prior to amalgamation within former Ottawa was: 1 – 50' Bangor, 2 – 35' Extensions, 1 – 20' Roof, 1 – 14' Roof, 1 – Attic, 1 – multi-purpose collapsible ladder. This complement existed for reasons previously identified - tactical necessity.

The lack of understanding is also evident by the adoption of rear mount ladders over the previously used mid mounted ladders within the city's core. Both designs will work but, insufficient consideration for the implication this design change would have on vehicle positioning and pumper pre-connected hose load configuration.

The hose loads are predicated on a mid-ship mounted ladder positioning at the corner or front of a building. The rear mount necessitates the pumper being further out of the block and therefore an additional length of hose would be required within the pre-connected hose load to ensure sufficient length to reach the objective.

Additionally, the mid mount ladder reduced the centre of gravity of the apparatus (less top heavy and lower profile) by virtue of not being over the rear wheel assembly and this also facilitated better ladder storage and ergonomic accessibility. The current design results in OFS having to physically cut down the 35' ladders to 32' so as to be able to fit within the stowage area and 45' Bangors have now replaced the 50' versions for the same reasons. Both sizes are non-standard in type.

Equally the transverse pump panel and hose bed configuration illustrate the same lack of understanding of congested streets (length vs. turning radius) and the requirement to move the pump out of the block or target residence and therefore all hose loads should be at the rear.

These specified choices impose tactical change without understanding consequence and many would be unaware of these consequences due to their lack of firefighting experience in a high density urban firefighting environment.

## **Acceptance Testing/ Training/ Commissioning**

Acceptance testing of this ladder into the fleet was never undertaken as Fleet Services had no mechanics qualified on the apparatus to undertake the acceptance testing. In addition there is no defined process within OFS and Fleet for such an undertaking.

Training consisted of a one-day shift instructor's course delivered by an OFS Training Officer. The shift instructors then delivered the same one-day course within the respective platoons. This training was significantly different than that provided on other ladder devices. For example, the previous Ladder 11 in service saw instructors attend the manufacturer's premises for a 4-day course and the OFS shift instructors then delivered a 2 day course to the operators. Operational documents were also provided whereas the current ladder saw only one vehicle manual shared amongst the four Platoons.

The vehicle was put in service (commissioned) while the crews were still developing familiarity with the systems associated with the hydraulic ladder. None of the Fleet Services staff had training on this type. The manufacturer currently advertises on the internet the recent acquisition of a training facility and that the first group to attend was Fleet Services mechanics in December 2007, approximately 9 months after the commissioning of Ladder 11 and the Forward Avenue event. There was no commissioning process.

### **Performance on Scene**

The crew of Ladder 11 on the morning of the fire had undertaken a 1-1/2 hour familiarization session with the officer (Lt. Tim TAYLOR) as this was his first day assigned to the ladder. No pumping operations or familiarization were possible due to extreme cold and concern for freezing of the waterway.

At the fire Lt. T. TAYLOR and firefighter Gerry BARRETT rode the extending ladder up to the rescue window while directing the Operator (Scott LOUSLEY) with hand signals for ladder placement. The ladder tip struck the frame of the window opening and bent the replaceable bolt-on tip. The ladder mechanisms and main structure were not damaged in the event.

Upon learning that firefighters were jumping from the upper level on side 4 from Pump 11B operator, Ladder 11 operator moved the ladder to position it under the firefighter (R. WITHAM Pump 11B) hanging from the window. Ladder 11 operator was unaware that the firefighters so imperilled were Pump 11B members and assumed that they were Ladder 11 members.

While rotating the hydraulic ladder it ceased to operate. In response to this unexpected event the operator undertook a systematic effort to troubleshoot the operating conditions and in the course of troubleshooting identified that the red "outrigger (stabilizer) not extended" light was not lit (indicating full extension).

Subsequent to checking the power take off (PTO) status in the cab of Ladder 11 and returning to the pedestal the operator identified that the red outrigger light was now lit, indicating a short jack situation which locks out normal control of the ladder to avoid overload conditions.

The operator descended the ladder and informed the Platoon Chief (Gerry HILL) of the ladder condition and ran to assist Ladder 11 crew members who had jumped out onto the porch roof to safety as their ladder was no longer in position to provide egress.

All subsequent operations of the ladder were made using the safety bypass toggle switch located at the right rear bumper area. Initially, the bypass was operated by Ladder 11 Fire Fighter BARRETT so that operator LOUSLEY (while at the pedestal) could operate the ladder for water tower operations.

The pump on Ladder 11 would not flow water initially due to the failure of the solenoid switch on the Master Intake Valve (MIV). Lieutenant TAYLOR proceeded to operate the pump but was

untrained in the use of MIV manual bypass. Fortunately, Fire Fighter Dante AEILO (deceased) from Pump 22 crew performed the manual bypass of the MIV to allow water flow.

Fire Fighter BARRETT was relieved of his outrigger bypass position and proceeded to advance a 2-½ inch hose line. Both Fire Fighter BARRETT and Lieutenant TAYLOR were then relieved of duties and sent to the hospital as it became apparent to FMT members in attendance that these two men had just finished jumping from the structure fully involved in flame. (**Note:** This is after TAYLOR and BARRETT jumped from the building and should identify for the reader the urgency of action due to extreme fire conditions, lack of personnel for firefighting and their incredible discipline and dedication to duty.)

Operator LOUSLEY remained in operation of Ladder 11 until relieved by Fire Fighter Chris BAILEY. Prior to being relieved, Swansea Mechanic Rene LAVIOLLETTE was called to the scene and attempted to extend the outriggers using the safety bypass. The outriggers did not move and the red outrigger 'do not extend' light remained lit.

## **Post Fire**

A meeting took place on the 15<sup>th</sup> of February, 2007, to address worker concerns with Ladder 11. Many of the concerns of that day are expressed in this Report along with a more detailed historical review. Unfortunately, some 18 months after the event fleet issues and ladder devices continue to be the focus of technical and operational concern.

Ladder 11 continues to demonstrate electrical faults within warning systems, sensors and the operator's display terminal. Disturbingly, most recently (reported June 20<sup>th</sup>, 2008) Ladder 13 (Pool # 76-0549), a twin to Ladder 11, had a deployment of the outrigger without operator initiation while in transit. Confidence in these essential fire fighting vehicles is mixed.

Positively, the recent acknowledgement that the front suspension, which had made the Carl Thibault/RK ladder series feel unstable when responding or encountering grade changes, has seen the installation of additional leaf springs and a new style of tire for the enhancement of front suspension characteristics. Unfortunately, this concern took over a year to be accepted as real and was dismissed as "belly aching" – remarkably at one point a suggested fix was to lower the tire pressure to reduce the vehicle's bounce.

With respect to newly commissioned apparatus little has changed. In early May 2008 the new Rescue 53 was placed into service with astounding deficiencies that could have resulted in injuries or worse, possibly fatalities. The revelations concerning the commissioning of Rescue 53 is extremely troubling in light of the issues previously raised regarding Ladder 11 by workers.

Subsequently it has been disclosed to the JOHSC that half of the HME 1871 series Fort Garry pump fleet have cracked frame elements. What is clear from the Association's Health and Safety Committee research is that any wheelbase over 200 inches requires frame rail reinforcement per the chassis manufacturer.

Perhaps this is a result of a traditional urban style side pump panel being changed to a rural/suburban style transverse pump panel configuration. The change in length from 196 inches to 218 inches without reinforcement would appear to be a root cause of these failures.

A recent fire demonstrates that concerns expressed by workers after Forward Street have been ignored as it relates to the impact the shortage of staffing and properly equipped ladders. The fire was at 3703 Alderwood Avenue in Blossom Park. P33, P31, L35 and C30 were 1st due (OFS Inc.

# 08-40808). The 1st due Ladder, L33 (E-One 100' aerial ladder), was out of service due to staffing shortages. L33 being out of service is critically important in light of subsequent events.

The fire building was a recently vacated residential two-storey wood frame structure, clad with stucco and aluminum, with detached garage. Both structures are set back from the street approximately 25 feet and have hydro, phone and cable wires running along the street at the front on Side 1. This is an older neighbourhood with an elevated roadway, gravel verges and drainage swales in the place of storm sewers.

Upon arrival there was heavy fire on the ground floor and considerable smoke from the second floor and roof area. Due to these conditions Command ordered a defensive operation. Once the main body of fire was knocked down offensive operations were commenced. In switching between defensive and offensive modes, Command ordered L35 to vent the asphalt shingle covered gable roof – a normal process to ensure safety to attack crews who were preparing to enter the building. L35 reported that due to the overhead wires and soft road shoulders they could not access the roof using their ladder tower. Instead ground ladders would have to be raised.

Command called for 2 x 35' ladders and 2 roof ladders, one at the front and one at the rear to ensure firefighter safety in egress. L35 reported their apparatus (E-One 95' ladder tower) only carried a single 35' ladder. They were directed to set this ladder up at the rear as the fire appeared to be located towards the front of the house.

Based on this shortage of ground ladders Command requested a second Ladder through Dispatch and L37 was dispatched. Upon arrival they were directed to bring their 35' to the scene and to assist with opening the roof. L37 informed Command that their apparatus (Thibault 100' SkyPod) was not equipped with a 35' ladder but rather only two 24' ladders. In light of this L37 was directed to bring both their 24' ladders to the scene and tasked with removing the aluminum siding from the upper level on Sides 1 and 2.

Command requested an additional Ladder through Dispatch, this time specifying that it must have a 35' ladder and Ladder 22 was dispatched. When Command was informed by Dispatch that Ladder 22 (Lincoln Fields) was coming he was stunned. This station is one of those in the urban service part of the City that is furthest from the emergency scene. While L22 was still responding the interior crews made significant progress on extinguishing the fire and Command decided to cancel L22.

This fire highlights two major concerns.

The first is that of out of service apparatus due to staffing and the second being how poorly equipped Ladders are that are deemed "essential and remain in commission at all times.

Had L33 been in commission this would have been a more tactically conventional fire with standard tactics employed. The flexibility of a straight aerial ladder over a ladder tower when it comes to positioning around overhead wires is well documented. While L33, too, only carries a single 35' ladder the aerial access to the roof combined with this ground ladder would have provided the required safety margin and no further Ladders would have been needed.

The requirement for 24' ladders to strip the aluminum siding and ladder the second storey windows could have been filled using the remaining ladders on L33 and ladders from the 1st due Pumps – not requiring the commander to summon vehicles from other parts of the city.

Given the areas these apparatus are expected to cover both geographically and in terms of construction it is imperative there be a re-examination of their capabilities. The OFS currently has **FIVE** models of Ladder in front line service and there are major inconsistencies in the equipment each carries. This has resulted in serious deficiencies in much needed equipment at the incident scene and limited Command's ability to quickly and successfully deal with the emergency.

The immediate "fix" is to dispatch a second aerial ladder as part of the standard Working Fire assignment. This would provide Command with the necessary tactical capacity through equipment availability and personnel to perform ladder crew functions and to avoid splitting (stealing) crews from other apparatus to perform ladder functions.

As the fire at 3703 Alderwood Avenue demonstrates the allocation and staffing of elevating devices has tremendous implications on service delivery and more importantly public and fire fighter safety.

The absence of Ladder 23 due to staffing on the day of the Forward Avenue fire and a subsequent fatal fire (OFS Inc. # 08-16875 – 31/03/08) cannot be ignored. It is not the contention of this Report that we conclusively say that no one would have been injured at Forward Avenue but, the Workers' Representatives believe those injuries would have been less severe had Ladder 23 crew been on scene and able to place ground ladders – again a routine element of operational tactics when staffing is adequate.

We also believe that properly staffed elevating devices with 5 personnel will ensure all ladder functions can be undertaken. The simple change of override controls on Ladder 11 demonstrates but one example of design change with unintended consequence. It now takes two people to operate the ladder safely.

Additionally, it is not our position that the aforementioned fatality is attributable to the absence of Ladder 23 but, we do say our fire fighters from 23 D Platoon would have had ladder company support (ground ladders, ventilation, search and Rapid Intervention) creating a greater margin of safety for other fire fighters while searching for the victim. In the absence of proper ladder company support the fire fighters conducting search and rescue did so at great peril to their selves while the victim's life was thought to be in the balance. The allocation of elevating devices within the city is a staffing issue and the functionality of ladder companies is a staffing issue. The reality of the FMT's current deployment model is that it exists to address staffing and not operational needs. There is no comprehensive evaluation of the allocation or the predominant requirement for vehicle style within the various districts.

For example, both District 20 and 40 have extensive strip malls yet not one district in the city has a tower ladder (crane boom with bucket) versus our ladder towers (aerial ladder with bucket). The advantages of the latter are critically important when attempting to project power operated elevated streams from an at grade position for tactical advantage and operational safety when there is minimal setback or roadway allowance. Our safety and tactical requirements are disadvantaged without a clear understanding of the issues and needs.

The needs can only be addressed through a risk assessment and analysis of those risks in the context of staffing and equipment within the diverse demographic and geographic response areas within the city.



The Workers' Representatives' key premise is all aspects surrounding the injuries to fire fighters must be evaluated and addressed and we feel the employer's report was deficient in its premise and scope.

The issue of operator error (ladder strike to building) is always a possible cause of ladder/outrigger interlock engaging and stopping the operation of the ladder – but it isn't the exclusive cause. The Workers' Representatives strongly object to the FMT's "default" to operator error in the wake of the serious events at Forward Avenue. These conclusions were reached based on the narrowest of research, more likely as a response to political/media pressures than operational reality.

In our analysis, based on the nature of reported repairs and event reporting the Carl Thibault/RK Ladders placed into service may have electrical control issues such as uncontrolled errant micro voltages, indiscrete or misaligned sensors or other factors yet to be identified. Given the unexpected behaviour from the vehicles, the Workers' Representatives are increasingly concerned about the reliability of future equipment performance.

Do we believe this to be the primary cause of the lockout of ladder control? Yes. Can we assert this cause to the exclusion of others? No. We are unable to make a more concrete evaluation of the cause of this problem due to the fact that no investigation or documentation was completed at the incident scene.

Assertions of cause and recreation of the fire ground operations are forever lost without hard data collection (measurements and photographs) on out rigger positioning and sensor location/alignment at the scene. We are left then to speculate.

The Association's Workers' Representatives strongly object to the City's handling of this critical equipment failure in light of the injuries sustained by members, and the potential injuries of Ladder 11 crew who also were forced to jump under escalating circumstances.

Nevertheless our investigation of Ladder 11 found severe organizational dysfunction with respect to how OFS apparatus are designed, specified, accepted, commissioned, repaired, allocated and staffed. Most importantly, and to avoid the potential of future incidents similar to Forward Avenue, the lack of worker input and representation and summary dismissal of their concerns must be corrected and professional control of the fleet restored.

The following recommendations are made to correct the extensive deficiencies found in the analysis of Ladder 11 and surrounding Fleet issues.

## Recommendations

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### *Ladder 11 – Fleet and Operational Issues*

It is recommended that:

- Fleet Services ensure that all personnel evaluating or performing work on OFS response apparatus be Certified Emergency Vehicle Technicians.
- Fleet Services ensure that any personnel evaluating or performing work on OFS response apparatus are trained to do so by the vehicle manufacturer.
- OFS, Fleet Technical Services and Financial Services Unit establish an Ottawa Fire Services Standard (“OFSS”) for specification of firefighting apparatus.
- Corporate Health and Safety develop an ergonomic review of proposed specifications and that ergonomic principles be included in any developed OFSS.
- OFS ensure that all apparatus placed into commission has an operator’s manual issued to the assigned station and that an additional copy is maintained on the apparatus and forms part of the vehicle inventory.<sup>39</sup>
- OFS ensure that all personnel operating fire fighting apparatus are trained in the use, tactical deployment and maintenance of said apparatus.
- OFS conduct a needs analysis with respect to apparatus type and allocation.
- OFS ensure that all power operated elevating devices with ground ladders have as a minimum complement: 1 – 50’ Bangor, 2 – 35’ Extensions, 1 – 20’ Roof, 1 – 14’ Roof, 1 – Attic, and 1 – multi-purpose collapsible ladder.
- OFS staff all OFS ladder companies with five personnel.
- Fleet Services establish written procedures for all phases of apparatus acceptance testing (new or refurbished), training, commissioning and annual testing.
- OFS augment the initial dispatch to a reported structure fire with an additional pump and ladder company for firefighting.
- OFS, Fleet Technical Services and Financial Services Unit establish a vehicle and equipment committee with a mandate for the design, specification, acceptance and commissioning of response and support vehicles.
- OFS ensure committee representation includes users and a Workers Health and Safety Representative.

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<sup>39</sup> This is an example of documentation that should be in an electronic library/technical knowledge repository as per Training Recommendations

## Post Incident Analysis (PIA)

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A PIA was held for this fire with the senior officers of "D" Platoon. Both Safety Officers of record for this incident requested to attend this event to express their views and provide input. Neither was invited to attend.

The process of PIA is one in which self-discovery and examination is held without the threat of censure or recrimination. The process has in the past been directly responsible for the generation of the Safety Officer's Report on Fire serves and has provided the opportunity for development of many ideas and recommendations for corrective measure.

Firefighting has traditionally been a job of experiential learning. Over the years however the opportunity for direct fire ground experience has diminished due to improvements in building compartmentalization, detection and prevention initiatives. Coupled with loss of opportunity for direct experience have been a dramatic shift in the chemistry of fire (petroleum based fuels) and a resultant increase in the potential for significantly more hostile fire events. Clearly, to combat the loss of this vital experience and address the modern fire environment the department must put in place systems and procedures that are built on the experiences (lessons learned) of significant events and communicated to all concerned.

The practices of "tail-boarding" (on scene operational review) and post incident analysis are methods of continuing and communicating experiential learning. Reports on fires serve the same purpose and it is has been the practice of the Safety Division to submit reports that examine our operational systems and procedures in the context of hazards encountered so that we may continue to learn and build on our successes and failures.

Excluding the attendance of Safety Officers at the Forward Avenue PIA, no access to Dispatch logs, and no company level interviews for this event did delay and limit the scope of the reporting as called for in Safety Officer Procedures as laid out in SOP SA 03.3-2001 and the OFS Health and Safety Management System ("HSMS").

A new Post Incident Analysis Programme has been introduced as of January 24<sup>th</sup>, 2008 - **SOP FI 03.5-2008 Post Incident Analysis Programme**. Contained within this latest programme at level 1, it indicates that a Safety Officer "could attend" a PIA suggesting that this Officer's presence is not necessarily a requirement. As well, **SOP SA 03.3-2001 Incident Safety Officer Duty and Responsibility – Revised**, does not allow for this exclusion and clearly indicates the Safety Officer will attend as part of his/her function. It is the opinion of the Workers' Representatives that these SOPs are in conflict. Further, the recently introduced Post Incident Analysis Program, for reasons cited above, should not allow for any exclusion of this position (Safety or other staff in attendance) from the PIA.

The Ministry of Labour's Final Report on the Forward Avenue Fire clearly states: "*The continued efforts of addressing worker concerns must be paramount in allowing the employer to fulfill his/her/their legislated obligations when it comes to Occupational Health and Safety*". The Workers' Representatives believe the SOPs identified herein do not adequately reflect this mandatory process.

The Workers' Representatives make the following recommendations for corrective action.

## Recommendation

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### *Post Incident Analysis (PIA)*

It is recommended that:

- Post incident analysis (“tail-boarding”) become a mandatory process at all incidents and that a formal PIA be held for 3<sup>rd</sup> Alarm fires and above, at any significant incident or when requested by chief officers.
- OFS ensures that the on-duty Safety Officer(s), Supervisor and Dispatcher for an incident requiring a formal PIA will be required to attend.
- A General Order reflecting these recommendations be developed and instituted detailing the requirements for a PIA.
- Copies of Safety Division “Report on Fire” reports be circulated to the Fire Management Team, JOHSC and within all Divisions.
- OFS establish a budget line item for reports on incidents to support the costs of investigation, report writing, reproduction and dissemination within the department.
- The practice of removing on-duty Safety Officers from operational duties and directing them toward off-site investigative duties should be discontinued, especially at major incidents.
- A General Order be developed identifying the roles and responsibilities of OFS personnel and allied agencies as they relate to the investigation of PPE, equipment, apparatus and scene conditions material to an event.

### **Injuries**

The five firefighters injured in their forced evacuation from the structure due to hostile fire conditions suffered a range of injuries, multiple fractures, burns, and other musculoskeletal trauma. The traditional view in the fire service is that only those who are near death are to be deemed “critically injured”. The definition of critical injuries as promulgated by R.R.O. 1990, REGULATION 834 CRITICAL INJURY Last amendment: O.Reg. 351/91 defines Critical Injuries as:

For the purposes of the *Act* and the Regulations, “critically injured” means an injury of a serious nature that,

- (a) places life in jeopardy,
- (b) produces unconsciousness,
- (c) results in substantial loss of blood,
- (d) involves the fracture of a leg or arm but not a finger or toe,
- (e) involves the amputation of a leg, arm, hand or foot but not a finger or toe,
- (f) consists of burns to a major portion of the body, or
- (g) causes the loss of sight in an eye. R.R.O. 1990, Reg. 834, s. 1.

Equally there are those who feel that the firefighters who only suffered relatively minor burns or musculoskeletal injuries have not been “critically injured”. It is the opinion of the Workers’ Representatives that all the firefighters who jumped to safety were in fact critical injuries as defined by the Regulations. The radiant heat of the fire forced them to jump as they were experiencing burns and therefore their lives were placed in jeopardy.

One other firefighter reported injury (fall) and many others lost footing due uneven ground, hose lines and icy conditions.

What is not reported or less tangible is the impact these injuries have had on morale and operational effectiveness throughout the service due to concern and introspection surrounding the event.

The members of 11 D Platoon who returned to their station, after being relieved at the fire, requested permission to attend the hospital. They were ordered not to attend the hospital and they disobeyed that order. Their action was borne of anguish and a crushing desire to see their injured co-workers as would any loved one.

The station members were never afforded an opportunity to decompress in the days following the fire and related a chilling account of attending a reported fire one week later. The operator of one of the apparatus assigned to Station Number 11 was called repeatedly by Command to move his vehicle improperly situated over an underground parking structure. The operator had left the vehicle and joined his crew who made entry into the underground to assess the situation.

The operator related that he didn't even remember joining the crew that had made entry into the structure. It wasn't until he was challenged by one of his coworkers that he realized he had entered the structure, abandoned his tactical position and unsafely positioned his apparatus nor did his coworkers until well after entry.

The operator stated that he "just wanted to stay with his guys." This event was noted by more than one of the members as proof that they shouldn't have been at work because mentally they were not. The unhealthy mind leads to unsafe acts.

There have been great strides within the fire service to manage threats to the physical well being of the firefighter. Many confuse physically safe with healthy and the confusion results in a workplace that is unhealthy and therefore unsafe. Modern health and safety definition has broadened to include health practice factors (lifestyle) and psychosocial factors (work organization)<sup>40</sup>. This fire demonstrates the risks and negative impact of "psychosocial hazards" within the workplace and during operations.

Psychosocial hazards relate to the organization of work, workplace stress, and the way people are treated which may include the following:

- Constant work overload
- Lack of control over how work is done
- Harassment, bullying, or discrimination on the job
- Lack of supervisor support
- Lack of respect for workers
- Lack of appropriate rewards and appreciation for the effort expended
- Lack of support for work-family balance
- Poor communication
- Ambiguity about job responsibilities

Most workers reported no injuries when questioned as to whether or not they had been injured at this fire. Interestingly when asked about their feelings/pain/worry those same workers cited with considerable anger the lack of respect/support, poor communication and harassment in the workplace. In some profound instances the anger moved to deeply expressed sadness at the breach in basic fairness afforded them. Sleep disorders were repeatedly mentioned.

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40 Burton, J., Industrial Accident Prevention Association, *Creating Healthy Workplaces*, 2006

The lack of respect/support comments centered on the fact that the majority had not been interviewed about the conditions they encountered on scene or the actions they took, rather, their actions were publicly questioned. Poor communications comments from the workers were based on the employer's report to the MOL and rumours about its content and the failure to release the report to the workers. Harassment was felt by those who challenged the approach to the reporting and the conclusions drawn.

Intuitively, most people recognize the unpleasant nature of these feelings but, fail to recognize both the acute and latent implications these feeling might have with respect to the workplace if the worker emotionally disengages. Research shows that feelings can be hazardous to the health and safety of employees by increasing the risk of:<sup>41</sup>

- Back pain by up to 3 times
- Heart disease by up to 3 times
- Injuries like musculoskeletal disorders by 2-3 times
- Substance abuse by 2 times or more
- Infections by 2-3 times
- Certain cancers by 5 times
- Conflicts and violence in the workplace by 2-3 times
- Mental illnesses like depression and anxiety by 2-3 times

The fact that so many workers expressed contempt/disgust should be of concern to any organization seeking a healthy and safe workplace. The potential for increased costs due to workers' compensation claims, absenteeism, short and long-term disability, and decreased productivity is significant in any workplace that fails to address these issues and the acute effects, as related earlier regarding the underground garage incident, could possibly be deadly in ours.

These were traumatic events for many of our firefighters and the potential for impact on firefighter's families is obvious but the process of family support and notification requires refinement and to be detailed in a procedure.

It is notable that most major fire services have established LODD protocols and have in some instances trained and assigned protocol officers to implement the protocols. It is the Workers' Representatives' position that OFS needs to establish a Line of Duty Injury Survivor ("LODIS") protocol that is focused on ensuring the well being of firefighters and their families post incident.

The manner in which worker's injuries are addressed within the workplace requires significant social and emotional investment and the Workers' Representatives make the following recommendations for corrective action.

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41 Burton, J., Industrial Accident Prevention Association, *Psychosocial Risk Management: What Every Business Manager Should Know!*, February, 2006

## Recommendation

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### *Injuries*

It is recommended that:

- OFS WSIB Injury Reports are reviewed for causal factors and addressed through recommendations from the JOHSC.
- OFS in cooperation with the Corporate Health & Safety, ensure that all OFS personnel receive awareness training for psychosocial hazards and their potential effects (psychosocial injuries) within the workplace.
- OFS develop, implement, and maintain a Line of Duty Injury Survivor (“LODIS”) Protocol that deals with the emotional needs, physical, and mental health of all affected personnel and addresses contingencies for family members.
- OFS assign the LODIS Protocol development, implementation and maintenance to the Protocol Officer and members of the Ottawa Fire Critical Incident Response Team (“OFCRT”).
- OFS establish a committee to review health and wellness within the workplace.





## Discussion

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It is human nature to seek single factors for success or failure and the result of that instinct can be commendation or condemnation. Current safety management thinking and theories of system failures and accident causation direct us otherwise.

Rather we should view success as the avoidance of many separate causes of failure. Informed safety management holds that if we understand the causes or factors involved in failure(s) we can manage safety (develop controls) for the hazards within the workplace if we also factor in organizational culture.

Evidence of the effectiveness of this approach to safety management is readily evident in an examination of the performance of the Personal Protective Equipment (“PPE”) used by the firefighters forced to jump from Building 1.

Not one of the firefighters would have survived the fire had their PPE not been worn as per OFS procedures or performed as per NFPA standards and maintained to same. The systems designed to manage this equipment reflect years of successful labour/management collaboration in refining failure avoidance.

It has become organizationally unacceptable to expect anything less.

The efficacy of our PPE management systems illustrates the importance of understanding hazards and their consequences within our workplace and most importantly that FMT cares about and has invested in the health and safety of the workers they lead.

The Workers’ Representatives through this Report demonstrate that there is an ever greater need to develop understanding with respect to the needs of the workers within and resulting from the work undertaken daily by our members.

The concept of a self-rescue system is a case in point. If any trades person was to work at height it would be inconceivable for them not be wearing a fall restraint or arresting device. In fact a Ministry of Labour inspector would issue a corrective order and fine for failure to use the control if the inspector observed someone working at height without it.

This fire demonstrates that the control of laddering for access/egress can be delayed or not undertaken due to priorities, conditions and lack of personnel. The firefighter, in the event of a fire above grade, should be afforded the same protection as any trades person, albeit a modified one suited to the needs of emergency work in fall control. A self rescue capacity seems obvious in this context

Context is key to understanding the safety issues involved and the development of appropriate solutions. Repeated reports have identified the need for Command Aides (the *Person*) and the solution offered by management is Command Aids (the *Machine*). It is an understandable position but it fails in response to context of history and change.

The fire service started out with chief officers having Aides because someone needed to look after the horses and buggy and act as a messenger for the chief who typically led firefighters into the fire. In essence the aide was a communications hub during an emergency.

The advent of the portable radio in the 1970’s and later economic pressures saw the removal of the chief’s aide as an inefficient allocation of human resources in terms of a management decision.

In the late 1980's significant change was again introduced with the advent of Incident Command System and the documented need for safety oversight and understanding of the limits of single individuals and their ability to manage within a span of control.<sup>42</sup>

The mandated safety oversight dictates limiting the span of control to ensure Commanders are not so overwhelmed with tasks that they fail in their responsibilities.

The introduction of command aids are necessary for modern communications and data transfer but add another task level activity that further distracts commanders from their executive duties.

Command Aides are not a luxury and are critical to safe and effective Command.

Context is best given by asking a simple question. Would any city manager be effective in their duties if their executive assistants were removed from their office? The emergency scene is the Commander's office and the lack of an executive assistant is dangerous.

Fire ground actions by our members have been called into question and rightly so. It is only through an analysis of our actions that we can learn and prosper from the experience.

Questions regarding the placement of ladders and hose lines are foremost mentioned as deficiencies in action. Additionally, the ventilation practices employed by Pump 11B crew while on the upper floor have also been cited as a possible contributing factor in the sustained injuries.

Others cite a failure to size-up the fire as having originated in the building and moved out versus originating outside on the balcony and moving into the building as the key factor. The Workers' Representatives are in agreement on these issues being factors in the critical injuries sustained by our members.

As described in the section on Investigation, we identified the need to examine beyond potential immediate causes and focus on root causes if we are to develop controls that will prevent further harm.

This Report has identified many root causes such as deficient codes, OFS response models predicated on a single family dwelling (2 Pumps, 1 Ladder and a Chief) to a high risk structure that at minimum requires 3 Pumps, 2 Ladders and a Chief with automatic augmentation should additional information or 911 calls indicate a fire condition.

Once there, the Commander is expected to implement a Command system that is under resourced and our firefighters are expected to follow training they haven't received and act in a coordinated manner when they can't communicate due to radio deficiencies.

Coupled with these systemic issues are modern fire dynamics and the effects of wind driven behaviours without the benefit of tactical guidance.

Ladder 11 is illustrative and symbolic of the system wide deficiencies that are at the root of the injuries to our members.

Contrary to what has been either stated or intimated, no fire fighters, officers or commanders acted recklessly or outside industry norms on Forward Avenue. All showed tremendous discipline under extreme conditions at great risk to themselves, commendable in that they demonstrated the finest traditions of the fire service in their actions and for some, acted with distinction and deserving of honour.

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42 Varone, Curtis, *Commands Right Hand Part 1*, Fire Chief Magazine, March, 2000

We believe that the collaborative example established in the management of PPE must be adopted in addressing the issues and concerns revealed in this Report. It is our position that an adversarial single factor(s) approach to safety will result in failure and develop a culture of failure and its consequent destructive effects due to the lack of context, worker input and continued harm.

The goal of the OPFFA through this Report is to provide understanding of the systemic factors linked to the critical injuries our members sustained at the Forward Avenue fire, and to represent our desire to collaborate with Fire Management Team in building safety management systems that address operational needs and are informed by safety culture.

It is only through understanding and collaboration that we can develop an organizational culture that is safe.



Photo courtesy of Scott Stilborn

