



The Office of the
Fire Marshal
Bureau du
Commissaire des Incendies



Fire Investigation Services

Confidential Fire Investigation Report Investigation No.: 218-011-2022



Investigation No.: 218-011-2022
Occurrence Date: 17-Jul-2022
Alarm Time: 18:07:00
Street. #: 19
Street: Courtice Crt.
Apt. #:
City: Clarington
Municipality: Clarington
Province: ON

Michael D. Ross
Fire Investigator

30-Nov-2022

Date

Bob Deasy
Technical Reviewer

30-Nov-2022

Date



The Office of the
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Fire Investigation Services

Confidential Fire Investigation Report Investigation No.: 218-011-2022

Major Occurrence:

Explosion Fire Fatal Non-Fire Fatal Serious Injury Large Loss Fire Safety Issues

Fire Investigator: Michael D. Ross

Fire Investigation Supervisor: Bob Deasy

OWNERS

1	Tom Stevenson
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Occurrence Date: 17-Jul-2022

Alarm Time: 18:07:00

Street: Courtice Crt.

Street. #: 19

City: Clarington

Apt. #:

Municipality: Clarington

Postal Code:

Attending Fire Department: Clarington Emergency & Fire Services

Attending Police Department: Durham Regional Police Service

Fire Cause: Classified for statistical purpose only as Accidental

Property Type: Police Station (without detention quarters)

Property Loss: \$2,000,000

FD Incident Number: 22-1264

Content Loss: \$20,000,000

FD Initial Attack: Offensive Defensive

Exposure Loss: \$0

FD Date and time On Scene: 17-Jul-2022 18:11:00

Total Loss: \$22,000,000

Date of Applic of the Agent: 17-Nov-2022 18:31:00

No Agent Applied:

Scene Release Date: 20-Jul-2022

Report Approved Date: 23-Dec-2022



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Response Criteria and Fire Investigation Summary

On July 17th, the Clarington Fire Service responded to a 911 call for a fire situated at 19 Courtice Court in Courtice. Upon arrival fire personnel encountered a large volume of fire towards the centre portion of the building. The fire was extinguished, and a scene assessment was performed where the total loss was believed to exceed one million dollars. Due to the circumstances surrounding the fire, the Office of the Fire Marshal was contacted.

The summation of the fire investigation included main components, namely area of fire origin (geographic boundaries of the fire), fuel loads (energy) responsible for the fire's spread (from the origin) and impact on the structure and the ignition sequence. The fire dynamics refined the area of origin to the centre of the building, more specifically the area where two motor vehicles (involved in a collision) were positioned. The fuel loads responsible for the fire's spread from origin were the material properties of the surfaces and items within each of the vehicles. The ignition sequence resulted from the one of the vehicles electrical system components.

Investigative Authority

The predominant purpose in this investigation was to determine the origin, ignition sequence and public fire safety elements. The fire investigation was completed under the regulatory authority of a *Fire Protection and Prevention Act (1997)*.

Involved Agencies

Durham Regional Police Service – Police personnel were responsible for obtaining witness information and maintaining scene continuity.

Clarington Fire Service – Personnel were responsible for conducting fire suppression operations and initial scene survey.

The scene processing was undertaken between the dates of July 17-20th, 2022. The Office of the Fire Marshal undertook the data collection and analysis during the dates listed.

Fire Protection Systems

The building did not have a sprinkler system within its boundaries that could be utilized for data retrieval into an area of origin or ignition sequence hypothesis.



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Additional data was received (from Durham Regional Police, December 2022) post scene processing regarding a fire alarm system and accompanying devices. A report was presented with some activation times but no linkage to the initial contact with fire personnel. The data received was in terms a floor plan and placement of devices, as well as the timeline of activations. Those timelines have been incorporated into the timeline analysis below. The data was analyzed to evaluate as to whether they present data for consideration for alternate hypotheses. The activations within the report fire alarm and trouble signals. Trouble signals occur after the initial fire alarm benchmark as they are indicating that the circuits between the devices and the panel are being compromised by the fire. The initiation of the fire service response was a function of a 911 call and not from the fire alarm system.

The building was equipped with surveillance cameras surrounding the building and the security system hard drive unit was positioned within the office area section of the building. The video surveillance equipment was utilized in the timeline analysis (below) for hypothesis testing

Emergency Service Response and Operations

The building was utilized by the Durham Regional Police and utilized for the storage of their oversized vehicle in the garage bays, as well as other specialty vehicles. Portions of the bays also utilized vertical rack storage.

Personnel brought two motor vehicles in through the bay north along the north side at approximately 14:32 hours. Both vehicles were involved in a collision which impacted the front end of both vehicles. The vehicles were placed in the centre of the building in the centre bay. Personnel were inside the office area of the building and exited through the main door on the north side. Personnel advanced through the bay where the vehicles were parked at approximately 15:48 hours.

The alarm time of the fire was 18:07 hours and police personnel reviewed their surveillance equipment which failed at 18:06 hours. Fire personnel arrived on scene at 18:11 hours and observed a large volume of flames and smoke from the centre portion of the structure and through a section of the roof. Fire personnel initiated a defensive fire suppression operation and portions of the roof had also partially collapsed prior to initiation and the fire was venting out through the top of the three large overhead doors within the east wall.

Building Construction and Utilities

The property involved in the fire consisted of two areas utilized by the Durham Regional Police. The north section was a two-storey building that consisted of offices, as well as property and evidence storage. The south section consisted of a larger volume of space that were configured in motor vehicles bays where their service vehicles were parked that were accessed from large



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overhead doors and man doors. The office and property areas had their own access doors from the exterior. An overhead and man door provided access between the two sections of the buildings.

The exterior walls were constructed of combinations of concrete block and brick, as well as metal clad over structural components (also metallic composition). The roof consisted of tar and gravel finish over metallic steel trusses.

The building was equipped with electrical service that entered the northwest quadrant of the south building. The main circuit breaker panels controlling the sections of the two building. The building was equipped with natural gas system which entered through the west side. The natural gas service meter and regulator were also position on the west elevation (of the south section).



Front of the section of the building where the fire originated

Interior Layout and Conditions

The interior of the building consisted of two sections. For the purposes of this report the north section will not be discussed other than a general description as it was separated from the main volume of the fire.

The interior of the south section was a combination painted concrete block and exposed metallic structure components. The ceiling across the structure was unfinished and consisted of exposed metallic trusses. The main circuit breaker panel and disconnects were also positioned on the north wall within northwest corner.



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The north section was occupied by a two-story portion occupied by offices, as well as the property and evidence storage. The south side consisted of a large compartment consisting of large overhead doors within the west, south and east sides. Individual man doors were also positioned within the same elevations. The south section housed large service vehicles (RIDE, Incident Command, Explosive Trucks, Tank) and rack storage of materials and were positioned in the center bay. The bays where the vehicles were parked were positioned and oriented in a west to east orientation. The property vehicle and the K-9 vehicle were parked in the northwest and east quadrants. The southwest corner consisted of a small-enclosed office space and upholstered seats (numerous) that had been removed from patrol vehicles. The southeast corner consisted of vehicle hoist area and storage of tires.

Exterior Fire Pattern Analysis

Data considered (ignition, flame spread and heat release rate being necessary variables for validity of an area of origin hypothesis) of the material properties of the potential fuel surfaces available on the exterior. Exterior walls and surfaces did not afford any data to support an area of origin hypothesis based on those necessary components for consideration.



Complete collapse of the roof towards the centre portion of the building which aligns with where fire personnel witnessed largest volume of fire

Residual pieces of metal clad of the roof structure

Interior Fire Pattern Analysis

Data considered (ignition, flame spread and heat release rate being necessary variables for validity of an area of origin hypothesis) of the material properties of the fuel surfaces available on the interior, as well as the additional factor's affecting a fire's development which will be discussed in the latter portions of the report. All the fire effects within the building (other than what will be referenced below) was a function of the fire plume development and methods of heat transfer.



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Metallic structural components depicting its warping and deformation towards the centre section. Fire effects in contextual analysis refutes alternate area of origin hypotheses

Area of Origin Analysis

The enclosure of origin was from within the south section of the building, namely towards the centre of the middle bay between the large command vehicles and the specialty service vehicles. Two motor vehicles were involved in a collision and were positioned between the aforementioned areas on the concrete floor and within the confines of four vertical steel I-beams.

The consideration and elimination of alternate hypotheses refined the area of origin to the centre of the south half of the structure. The specified variables considered in the hypothesis are discussed under the Validation and Testing of Hypothesis section of the report. The data presented within the section are the scientific principles that were relied on for the opinions generated within the report.

1. Except for the center portion of the building, the remaining quadrants within the enclosure did not afford data (ignition flame spread and heat release rate) to support the area of origin hypothesis. The impact and magnitude from the fire was towards the upper regions of the enclosing walls and surfaces available as a function of the material properties within the area of origin.
2. The data analysis of the ignition, flame spread, and heat release rate of the material properties and of the fuel surfaces combined and the enclosures themselves (passenger compartment of each vehicle) supports the area of origin from within one of the two vehicles. The proximity of the vehicles to one another creates the geographic location and outer boundaries of the area of origin.



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3. Responding fire personnel acknowledged that upon their arrival to the scene, the fire plume had penetrated through the roof of the structure, more specifically the center portion. The metallic structural components were compromised allowing for the fire plume to extend within and through the area specified. The evaluation of the witness information combined the material properties of the fuels and the factor affecting them supports the area of origin.



Two vehicles recovered
underneath the collapsed
sections of the roof and
structural components



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Fire Spread Sequence

The fire spread from the area of origin with the available fuel load, namely the combustible materials forming the two vehicles construction and finishes. The fire continued to spread horizontally within the vehicles involving the exposed fuels (upholstery and polyurethane foam padding of the seats) within the passenger compartments. The fire continued to spread across the exposed combustible surfaces within the vehicles allowing for increased fire plume size in a vertical direction. The energy released from the area containing the two vehicles resulted in a large enough fire plume to contact the underside of the ceiling directly above resulting in its partial collapse.

The fire continued to spread horizontally from the area of origin to the additional vehicles parked around the area of origin involving their combustible materials and surfaces due to the distance between the area of origin (once fire increased in diameter) and these specific items. The distance and proximity of the area of origin to the polyurethane foam seats that had been removed from the police cruisers was approximately the same distances as the vehicles parked adjacent to the area of origin. The fire diameter increased in a horizontal direction resulted in increased fire plume size vertically. The vertical fire spread resulted in the accumulation and descending radiant energy from the ceiling down towards the remainder of the exposed surfaces within the building, as well as creating the fire effects discussed.

The fire continued to spread into the north section of the building through portions of the concrete block wall separating the two portions of the building, as well as through the spaces around the doors between the north and south section. The fire was able to spread through the concrete block wall as a function of the partial collapse of the roof structure and the trusses that were attached to the concrete block. The deforming and warping of the steel trusses resulted in the concrete block separating and collapsing.

Consideration of Ignition Sequences

1. The radius of error methodology is one where the area of origin is defined and the area of processing of the materials is three times of the size for the identification of ignition sequences and potential additional area of origin considerations. Alternate ignition sequences (extension cords) were beyond the area of origin and specific pieces of data would need to be presented for an area of origin hypothesis beyond was refined and referenced within the report. Additional ignition sources and accompanying data were considered and refuted based on the geographic location and accompanying boundaries of the area of origin.
2. The ignition sequence, the application of an open flame to a combustible fuel (all three and each state of matter) within the boundaries of the area of origin was considered based on the temperature, energy, contact/proximity of fuels, and application time interval.



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3. The resistance fault and/or malfunction of a component of the electrical system was considered from each of the vehicles involved in the collision, namely the Jeep and the Honda. Evidence of electrical activity was recovered in battery area of the Jeep. There was localized consumption and mass loss of the area containing the battery of the Honda. The specifics of the analysis are contained within the *Forensic Engineering Report*.

Isolation of Ignition Sequences

1. The ignition sequence, the application of an open flame to a combustible fuel (all three and each state of matter within the boundaries of the area of origin was considered and refuted based on the temperature, energy, contact/proximity, and application time interval. The building was equipped with surveillance camera system and was a secured facility. There is no data to support the application of an open flame to the materials present within the time interval in relation to the alarm time and human activity within the building.
2. Each of the vehicles involved in the collision were equipped with a battery that formed the vehicles electrical systems power source. The scene processing of both vehicle's engine compartments revealed the presence of the remains of batteries (in varying degrees) for each vehicle. Witness information supplied by fire personnel who responded to the collision confirmed the power was not terminated after the collision. Portions of the cable and the bolt securing the power cable to the battery of the Jeep was recovered during the scene processing of the materials within the engine compartment. It should be noted that the area of impact to both vehicles was towards the driver's side of both vehicles where the batteries were housed. Forensic engineering conducted an analysis of the electrical system of both vehicles and confirmed that neither vehicle could be isolated over the other, however both remained a viable ignition sequence within each vehicle (as a function of the area of origin defined).



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Localized impact in
the area of the
battery in a vehicle

Validation and Testing of Area of Origin and Ignition Sequences

Validation is a standard of the scientific community where scientific literature and field demonstrations, as well as a time analysis is used to validate specific hypotheses in terms of the growth and magnitude/impact of enclosure fires with respect to the area of origin and ignition sequence analyses. These specific means of hypothesis testing are laid out within the confines of the National Fire Protection Association documents.

Fires are described in terms of peak heat release rate, time to peak heat release rate and time interval. The variables effecting the values presented are the initial heat fluxes to the surface, for example a small flame (of a match) compared to small spill of volatile ignitable liquid onto the surface and then the type, quantity, and orientation of the fuel(s) in combination with the additional variables discussed below.

The heat release rate values discussed are contained within the literature. The values are not exact values however based on the size of the item(s), but values can be reasonably inferred to be similar when discussing the impact and magnitude of the fires with area of origin hypothesis testing within an enclosure. The values presented under the ignition heading within this section follow the same considerations and principles.

There are five major factors influencing the fire's development in every enclosure fire and are divided into two categories. The principles of science relied upon in Paragraphs 1 and 2 will be for the fuels and the 3-5 will discussed the factors of the room on the fire if applicable. The falsification



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of alternative area of origin hypotheses was undertaken by the consideration of the initial fire size and location and the fuel(s) available (including the type, amount, position, horizontal vs vertical orientation and surface areas). The geometry of enclosure(s), size and location of enclosure openings and material properties of the enclosure boundaries.

Empirical Data in Relation to Area of Origin Hypotheses

1. The scene processing of the materials from throughout the building in combination with the fire effects formed across the surfaces and exposure of the materials supported the area of origin from within the centre of the building. Within the specified area and boundaries were two motor vehicles that were involved in a collision in the hours preceding the alarm time. Consideration and evaluation were given to the heat release rate of the two vehicles within the centre of the building.
2. Both motor vehicles possess a large amount of potential energy (solid state) relative to the surface area and volume (of the passenger compartments). Scene processing revealed interior finishes and available fuel(s) were consumed and released their energy into the fire. The non-combustible components as the remaining identifiable materials and surfaces. The vehicles were positioned horizontally on the concrete floor and surveying the building during scene processing did not afford a vertical fuel load and/or surface to consider for an alternate area of origin other than materials in proximity to the vehicles. Spacing to adjacent fuels and combustible materials was considered, namely between the two vehicles, as well as materials and surfaces surrounding the vehicles for alternate area of origin considerations. The closest fuel and exposed combustible surface area were within the service bay consisting of several seats that had been remove from the patrol vehicles.
3. The room geometry of the enclosure was a typical rectangle with a total volume of 6032m³. The room volume of the building was a large compartment with a high ceiling height compared to the typical enclosure. The ceiling height relative to the exposed surface areas and potential energy available within the two motor vehicles assisted in the impact from the radiant energy layer descending in the building. The flame spread and development within the passenger compartments (with available fuel) resulted in the ignition of the materials surrounding the area of origin due to proximity from a lateral. The ceiling height overtop of the area of origin was ~ 8.5m.
4. The oxygen entrainment into the fire plume during the growth of the fire, as well as the introduction and entrainment of oxygen from the atmosphere were also considered in combination with the fire effects, namely as a variable in the development of the effects and their context. The area of origin was from the centre of the building consisting of the two primary fuel loads responsible for the impact and magnitude of the fire's development on the building.



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5. The interior wall and ceiling linings were considered in the development of the fire. The interior finishes on both the enclosing walls and ceiling were of a non-combustible finish and did not contribute to the fire's development. The scene processing and surveying throughout the structure confirmed this specific piece of data was not within the confines of the building and ultimately led to the development of alternate area of origin hypothesis. The building was constructed primarily of concrete block and metallic materials. The only combustible surfaces that would offer similar variables would be the items on the rack storage.

Empirical Data in Relation to Ignition Sequence Hypotheses

1. The ignition sequence hypotheses were evaluated with the energy and temperature profiles of the ignition source, material properties and state of matter, the proximity and contact along with the time interval of the combined data.
2. The area of origin of the fire was refined to the areas of the engine compartments of the vehicles. The lone viable ignition sequence within the area of origin was the ignition resulting from the electrical system of the vehicle(s). Both vehicles had evidence of the vehicle's electrical system involved in the fire.
3. The vehicles were involved in a head on collision which resulted in impact towards the driver's side of both vehicles and the specified area that contained the power source (battery and accompanying components). Forensic engineering surveyed the area and recovered portions of the conductors to the battery on the Jeep, as well as evidence of arcing on the residual sections of conductors. The battery and the accompanying components of the Honda's were consumed with sufficient mass loss where very small fragments were recovered.
4. It had been previously stated that the vehicles were involved in a head on collision in Durham Region. The responding fire personnel was a different municipality and confirmed upon arriving at the accident scene the batteries to each vehicle were not terminated or disconnected because of the classification of the collision. The surveying and processing of the materials surrounding the battery (of the Jeep) revealed the presence of the bolt securing the post to the battery and a portion of the conductor. In additional Forensic Engineering identified a localized area of material loss of the metallic body construction of the vehicle. The localized area of consumption and mass loss aligned with the electrical activity identified by Forensic Engineering along the lengths of conductors to the battery.



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5. Below is a table with a time interval utilized as analytical component utilized in the testing of the area of origin and ignition sequence hypotheses.

Date	Source	Time	Event
07/17/2022	Durham Regional Police	2:32:00 PM	Vehicle in collision brought into building
07/17/2022	Durham Regional Police	2:57:00 PM	Vehicle in collision brought into building
07/17/2022	Durham Regional Police	3:48:00 PM	Police personnel exits the building through side entrance
07/17/2022	Durham Regional Police	5:10:00 PM	Glow observed in the camera on the north side
07/17/2022	Durham Regional Police	5:55:00 PM	Smoke observed on the camera on the south side
07/17/2022	Sage Electrical Company	5:56:29 PM	Fire alarm received
07/17/2022	Clarington Fire Service	6:05:28 PM	Alarm time of the fire
07/17/2022	Clarington Fire Service	6:11:57 PM	Fire service on scene and smoke visible
07/17/2022	Sage Electrical Company	6:13:00 PM	Trouble signal received
07/17/2022	Clarington Fire Service	6:15:55 PM	Command established by fire personnel
07/17/2022	Sage Electrical Company	6:16:00 PM	Fire alarm received
07/17/2022	Sage Electrical Company	6:16:47 PM	Trouble signal received
07/17/2022	Sage Electrical Company	6:16:49 PM	Trouble signal received
07/17/2022	Clarington Fire Service	6:25:27 PM	Fully involved structure fire
07/17/2022	Clarington Fire Service	6:28:08 PM	Defensive attack initiated



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07/17/2022	Clarington Fire Service	8:05:25 PM	Ventilation initiated
07/17/2022	Clarington Fire Service	8:10:40 PM	Primary search completed of first floor
07/17/2022	Clarington Fire Service	8:15:31 PM	Primary search completed of second floor



Localized impact surrounding the battery of the vehicle

Conclusion

The fire was a function of an area of origin, fuel load (energy release) to substantiate the fire's spread (to test the origin as a function of fire dynamics) and the isolation of the ignition sequences. The fire dynamics refined the area of origin to the centre of the building, more specifically the area where two motor vehicles (involved in a collision) were positioned. The fuel loads responsible for the fire's spread from origin were the combustible surfaces and items within each of the vehicles. The ignition sequence resulted from a fault of one of the vehicles electrical system components (resulting from the collision).

The assessment and/or identification of those parties having possible criminal and/or civil responsibility for the fire is beyond the scope of the analysis.

Property Exposures



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The did not spread beyond the building of fire origin.

References

- Cooke, R. A. (1992). *Principles of Fire Investigation*. New Walk, Leicester: Institution of Fire Engineers.
- Drysdale, D. (2011). *An Introduction to Fire Dynamics, 3rd Edition*. United Kingdom: Wiley.
- Gorbett, G. E. (2011). *Fire Dynamics*. Upper Saddle River: Pearson Education Incorporated.
- Hurley, M. J. (2016). *SFPE Handbook of Fire Protection Engineering, 5 Edition*. Springer New York: Springer.
- Pagni, P. J. (1991). Glass Breaking In Fires. *Fire Safety Science-Proceedings of the Third International Symposium* (pp. 791-802). Berkeley, California: Mechanical Engineering Department-University of California.
- Quintiere, J. G. (2017). *Principles of Fire Behaviour*. Boca Raton, Florida: CRC Press.

Fire Safety Issues

There are no fire safety issues in relation to this matter.



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PERSONS LIST

Person Number: 1

First Name:	Last Name:	Business Name:	Positive ID: <input type="checkbox"/>
Tom	Stevenson		
19 Courtice Court		Owner: <input checked="" type="checkbox"/>	Discoverer: <input type="checkbox"/>
Clarinton, Ontario		Occupant: <input type="checkbox"/>	Visitor: <input type="checkbox"/>
		Fire Fatality: <input type="checkbox"/>	Witness: <input type="checkbox"/>
		Non-Fire Fatality: <input type="checkbox"/>	Charged Youth: <input type="checkbox"/>
		Serious Injury: <input type="checkbox"/>	Charged Adult: <input type="checkbox"/>
Distribution: <input type="checkbox"/>		Fire Dept.: <input type="checkbox"/>	Other: <input type="checkbox"/>
		Police: <input type="checkbox"/>	Coroner: <input type="checkbox"/>
		Analyst: <input type="checkbox"/>	Exposure: <input type="checkbox"/>
Statement:			Deceased: <input type="checkbox"/>

Person Number: 2

First Name:	Last Name:	Business Name:	Positive ID: <input type="checkbox"/>
Matt, Detecitve	Bowler	Durham Regional Police	
605 Rossland Road East, Box 911		Owner: <input type="checkbox"/>	Discoverer: <input type="checkbox"/>
Whitby, Ontario		Occupant: <input type="checkbox"/>	Visitor: <input type="checkbox"/>
		Fire Fatality: <input type="checkbox"/>	Witness: <input type="checkbox"/>
		Non-Fire Fatality: <input type="checkbox"/>	Charged Youth: <input type="checkbox"/>
		Serious Injury: <input type="checkbox"/>	Charged Adult: <input type="checkbox"/>
Distribution: <input type="checkbox"/>		Fire Dept.: <input type="checkbox"/>	Other: <input type="checkbox"/>
		Police: <input checked="" type="checkbox"/>	Coroner: <input type="checkbox"/>
		Analyst: <input type="checkbox"/>	Exposure: <input type="checkbox"/>
Statement:			Deceased: <input type="checkbox"/>



Fire Investigation Services

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Person Number: 3

First Name:	Last Name:	Business Name:	Positive ID: <input type="checkbox"/>
Mariano	Perini	Clarington Fire Services	
		Owner: <input type="checkbox"/>	Discoverer: <input type="checkbox"/>
		Occupant: <input type="checkbox"/>	Visitor: <input type="checkbox"/>
		Fire Fatality: <input type="checkbox"/>	Witness: <input type="checkbox"/>
2430 Highway 2		Non-Fire Fatality: <input type="checkbox"/>	Charged Youth: <input type="checkbox"/>
Bowmanville, Ontario		Serious Injury: <input type="checkbox"/>	Charged Adult: <input type="checkbox"/>
905-706-0714		Fire Dept.: <input checked="" type="checkbox"/>	Other: <input type="checkbox"/>
Distribution: <input checked="" type="checkbox"/>		Police: <input type="checkbox"/>	Coroner: <input type="checkbox"/>
		Analyst: <input type="checkbox"/>	Exposure: <input type="checkbox"/>
Statement:			Deceased: <input type="checkbox"/>

Person Number: 4

First Name:	Last Name:	Business Name:	Positive ID: <input type="checkbox"/>
Arend J. General Cousel	Wakeford	Durham Regional Police - Legal Services	
		Owner: <input type="checkbox"/>	Discoverer: <input type="checkbox"/>
		Occupant: <input type="checkbox"/>	Visitor: <input type="checkbox"/>
		Fire Fatality: <input type="checkbox"/>	Witness: <input type="checkbox"/>
605 Rossland Road East		Non-Fire Fatality: <input type="checkbox"/>	Charged Youth: <input type="checkbox"/>
Whitby, Ontario	L1N 0B7	Serious Injury: <input type="checkbox"/>	Charged Adult: <input type="checkbox"/>
		Fire Dept.: <input type="checkbox"/>	Other: <input type="checkbox"/>
Distribution: <input checked="" type="checkbox"/>		Police: <input checked="" type="checkbox"/>	Coroner: <input type="checkbox"/>
		Analyst: <input type="checkbox"/>	Exposure: <input type="checkbox"/>
Statement:			Deceased: <input type="checkbox"/>

Exhibits Seized Yes No

FIRE CAUSE

Fire Cause: Classified for statistical purpose only as Accidental
Motive: Not applicable
Explosion Type:
Fuel Involved:



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Property type: Police Station (without detention quarters)
Ignition Source: Multiple Ignition Sources or Igniting Equipment
Fuel of Ignition Source: Electricity
Area of Origin: Engine Area
Object First Ignited: Insulation
Incendiary Device: None detected

STRUCTURAL DATA ELEMENTS

Complex: Other
Building Status: Normal (no change)
Occupancy Status: Permanent - No Person(s) Present
Construction Date: After 1975
Number Storeys: 2.0
Building Area: 601-2000 sq M (6,458-21,258 sq ft)
Floor Construction: Non-combustible
Ceiling Construction: Exposed metal joists
Roof Construction: Non-combustible
Interior Construction: Exposed metal studs
Level of Origin: 1st Floor
Flashover: Not applicable
Fire Spread: Not applicable
Fire Spread Reason(s):
Smoke Spread: Not applicable
Smoke Spread Reason(s):

FIRE ALARM

Device Closest to the Area of Origin: None present
Device Number: 1
Device Type: Heat detector (part of a fire alarm system)
Device Location: In room of fire origin
Alarm Type: Combination



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Alarm Power: Hardwired
Alarm Placement: Ceiling mounted
Device Operation: Device operated
Reason Inoperation:

HUMAN BEHAVIOR

Number Persons in Structure: 0
Number Persons Escaped: 0
Building Safety Plan: Not applicable
Plan Posted: Not applicable
Followed Escape Plan: Not applicable
Alcohol a Factor: Not applicable
Smoking a Factor: Not applicable

FI ASSISTANCE

Anticipated Evidence of: Clive Hubbard

On Tuesday the 19th of July 2022 I was assigned to attend at 19 Courtice Court in Clarington and assist FI Mike ROSS #218 with his investigation into the origin and cause of this large loss fire.

I arrived on scene at 17:30 hours. FI ROSS, Supervisor S. LORIMER and FFPE E. RANDE SALU were already on scene. I was briefed and provided with a tour of the site by FI ROSS.

The building in question was the property bureau and specialized unit officers of the Durham Regional Police Service. The building was located on the south side of Courtice Court east of the intersection with Progress Drive and was just north of the 401 Highway. The building consisted of three parts and was surrounded on the east, west and south sides by paved areas. The two-storey office section was positioned in the N/W corner. This area housed offices for the property bureau, fleet management, K-9, firearms, and the services Quartermaster. Located in the N/E corner was the property bureaus storage facility. This portion of the building contained seized exhibits, notes, files, and other documents related to investigations that have been and are actively under investigation or before the courts in Durham Region. The entire southern portion of the building consisted of areas associated with vehicle maintenance, storage of specialized vehicles, property, and equipment.

The building was constructed on a concrete pad (no basement) with steel framing and flat steel covered roof. The exterior of the building consisted of concrete cinder block on the ground level with steel sheeting on the 2nd or upper portion of the building. Interior finishes consisted of painted drywall with carpeted and tiled floors. Fiber tiled drop ceilings extended through out the office section of the building. Interior furnishings were consisted with what would be required in any general office environment.

I was assigned by FI ROSS to supervise the removal of standing water from the interior of the southern portion of the building. This was accomplished by outside contractors utilizing a vacuum truck. I was also assigned to assist FFPE RANDE SALU with his examination of two motor vehicles that were basically located in the centre of the southern portion of the building. Debris was removed and examined for evidence from around both vehicles. I also took a series of photographs of the exterior and interior of the office and property storage areas of the building.

I participated in a general discussion with FI ROSS and FFPE RANDE SALU on the origin, ignition sequence and fire spread hypothesis for this fire.



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The photographs were placed in FI ROSS's SWAP folder.

Anticipated Evidence of: Eerik Randsalu

Summary of Findings

On July 19, 2022 I received a request from Forensic Engineering Team Lead John McGlashan to assist Fire Investigator Michael Ross in the investigation of a fire at the Durham Region Police Property Bureau. Investigator Ross narrowed down the area of origin in the warehouse portion of the building to the central area where the two vehicles from the collision were located. The scope of my examination included the evaluation of electrical equipment and the vehicles within the warehouse. I also carried out aerial photography using a remotely piloted aircraft (drone). The examination at the scene was carried out on July 19 and 20, 2022.

I was provided with the following information regarding circumstances prior to the fire. Two vehicles were involved in a serious collision shortly after 05:00 hrs on July 17, 2022. Both vehicles were towed to the Property Bureau at 14:32 hrs (according to security video) and parked inside the warehouse portion of the building for examination on the next day. At approximately 15:48 hrs, the last staff member left the building via the warehouse, walking past the vehicles from the collision, and did not notice anything unusual. At 18:06 the security cameras went offline and a minute later the alarm system activated. Shortly afterwards, responding personnel observed large quantities of smoke coming from the warehouse portion of the building.

I was also provided with police photographs obtained at the collision scene which showed the condition of the vehicles prior to the fire. Neither vehicle experienced a fire immediately after the collision. One vehicle was a 2021 Jeep Compass, VIN 3C4NJDAB3MT569055, with a 2.4 L gasoline engine and the other was a 2007 Honda Civic, VIN 2HGFG12617H012226, with a 1.8 L gasoline engine.

There were no building electrical components in the area of origin, nor was there any evidence of any cords routed through the area. A search for safety recalls did not yield any fire related recalls associated with those VIN numbers. Both vehicles exhibited impact damage to the front of the vehicle, with the most significant damage to the driver's side portion of the engine compartment. The battery and at least one of the fuse/relay boxes for each vehicle was located in the driver's side of the engine compartment. The Jeep's driver's side front wheel and strut had been torn off in the collision and the collision scene photos showed the fuse/relay box hanging by the conductors, though the battery appeared to still be in place. Other conductors were also hanging out of the engine compartment in those photos.

The fire had caused extensive damage to both vehicles. Almost all combustible material was completely consumed and low melting point metals had melted. The Jeep radiator had melted, and the alternator had fallen from its mounting location. After the fire, the fuse/relay box was no longer present. The battery was still in place but the plastic enclosure was consumed and only the lead plates were remaining. The negative battery cable clamp was recovered, although it was detached from the cable. The positive clamp was not recovered. A wiring harness from the battery was routed through the driver's side of the firewall into the passenger compartment. In this area was the wheel strut mount location, around which the sheet steel of the engine compartment had torn. There was evidence of possible beading on the wiring at this location, as well as arcing damage to a part of the steel where the tear was located. Arcing can occur when the insulation on an energized conductor becomes damaged and contacts a metal part to complete a circuit. A fire can damage the insulation, as can a collision. A complete assessment of the vehicle's conductors could not be completed due to the extensive damage.

The collision damage to the Honda affected a wider portion of the engine compartment, though it was still focussed on the driver's side. The battery had been more significantly affected as it could no longer be fully located. Some of the lead plates were found beneath the engine compartment. The battery cable clamps were not recovered. No evidence of beading was observed, but a complete assessment of the vehicle's conductors could not be completed due to the extensive damage.



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Fire Investigation Services

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The following conclusions were established as a result of my examination. The building electrical components were eliminated as a cause of the fire. As a result of the timelines since the collision, the potential for a hot engine or exhaust component from being the cause of the fire can be eliminated. An electrical fault in the Honda could not be confirmed or eliminated as a cause of the fire due to the extensive fire damage, and as such it should be considered as a possible cause. In the Jeep, an electrical fault was observed in the engine compartment in proximity to a sharp steel edge that had developed as a result of the collision. This should be considered as a possible cause of the fire, however, since the rest of the vehicle was extensively fire damaged, a failure elsewhere in the vehicle should also be considered as a possible cause.

In accordance with instructions received regarding this assignment I have completed this FI Assist entry with a summary of my findings. My opinions or findings are based on the results of my investigation process which has been well over 50 digital image files which have been retained along with my field notes in the master file. A formal report will not be created at this time but may be if instructed to do so by the Office of the Fire Marshal. This FI Assist entry is for OFM use and is not intended to comply with Rule 53 of the Rules for Civil Procedure.

Eerik Randsalu, P.Eng.
Forensic Fire Protection Engineer
November 30, 2022