

Mathematics plays an important role in **disaster management**, especially during emergencies such as the **fire at the Computer World Building in Bois d'Orange**. Mathematical concepts help emergency services **plan, respond, control damage, and estimate losses**. Below are several ways mathematics could be used in this case study.

1. Time Calculations and Response Efficiency

Mathematics helps determine how quickly emergency services respond.

- The distress call was received at **8:54 p.m.**
- Firefighters then had to calculate **travel time** from stations such as:
 - Gros Islet Fire Station
 - Babonneau Fire Station
 - George Charles Fire Hall
 - Fire Service Headquarters

Using **time calculations and averages**, they can measure:

- **Response time**
- **Average arrival time of units**
- **How response time affects fire spread**

Example:

If one unit took **12 minutes** to arrive and another took **18 minutes**, the **average response time** is:

$$\text{Average} = \frac{12 + 18}{2} = 15 \text{ minutes}$$

This helps improve **future emergency planning**.

2. Estimating Fire Spread (Rate and Speed)

Mathematics can model how fast the fire spreads inside a building.

Firefighters may estimate the **rate of fire spread** depending on:

- Amount of combustible materials
- Presence of **lithium-ion batteries**
- Building size

Example:

If fire spreads **6 meters every minute**, after **10 minutes** it may spread:

$$6 \times 10 = 60 \text{ meters}$$

This helps firefighters decide:

- How many crews are needed
- Where to attack the fire

3. Multi-Point Attack Strategy (Geometry & Spatial Planning)

The SLFS reported using a **multi-point attack**.

Mathematics and geometry help determine:

- **Angles of hose streams**
- **Distance between firefighters**
- **Optimal attack points around the building**

Firefighters may divide the building into **sections or zones** to control the fire more effectively.

For example:

- Front sector
- Rear sector
- Left flank
- Right flank

This is similar to **coordinate geometry and spatial mapping**.

4. Water Supply Calculations

Firefighters must calculate **how much water is needed** to extinguish the fire.

Example:

If a fire hose releases **500 litres per minute** and it operates for **30 minutes**:

$$500 \times 30 = 15,000 \text{ litres of water}$$

Mathematics helps determine:

- Water demand
 - Tank capacity
 - Hydrant supply from Water and Sewerage Company (WASCO)
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5. Risk Probability and Hazard Assessment

Since the building contained **lithium-ion batteries**, mathematics can help calculate **risk probabilities**.

Example factors:

- Probability of **battery explosion**
- Likelihood of **reignition**
- Spread to nearby buildings

Fire authorities like the Saint Lucia Fire Service may use statistical data from past fires to estimate risks.

6. Estimating Economic Loss

Mathematics is used to estimate **financial damage**.

Example:

If:

- Building value = **\$2,000,000**
- Equipment value = **\$800,000**
- Remaining salvage value = **\$200,000**

Loss calculation:

$$\text{Total Loss} = 2,000,000 + 800,000 - 200,000 = 2,600,000$$

This information helps:

- Insurance companies
- Government recovery planning

7. Temperature and Cooling Calculations

Firefighters remain on scene until the structure **fully cools**.

Mathematics helps track **temperature decline over time** to prevent reignition.

Example:

If the structure cools at **20°C per hour**, and the fire temperature was **400°C**, the cooling time can be estimated.

Conclusion

Mathematics helps emergency services such as the Saint Lucia Fire Service make **accurate decisions during disasters**. In the Bois d'Orange fire case, math can be used to:

- Calculate **response times**
- Estimate **fire spread**
- Plan **multi-point attack strategies**
- Determine **water supply**
- Assess **risk of hazardous materials**
- Estimate **financial losses**

Without mathematics, managing disasters like this fire would be **less organized, slower, and more dangerous**.