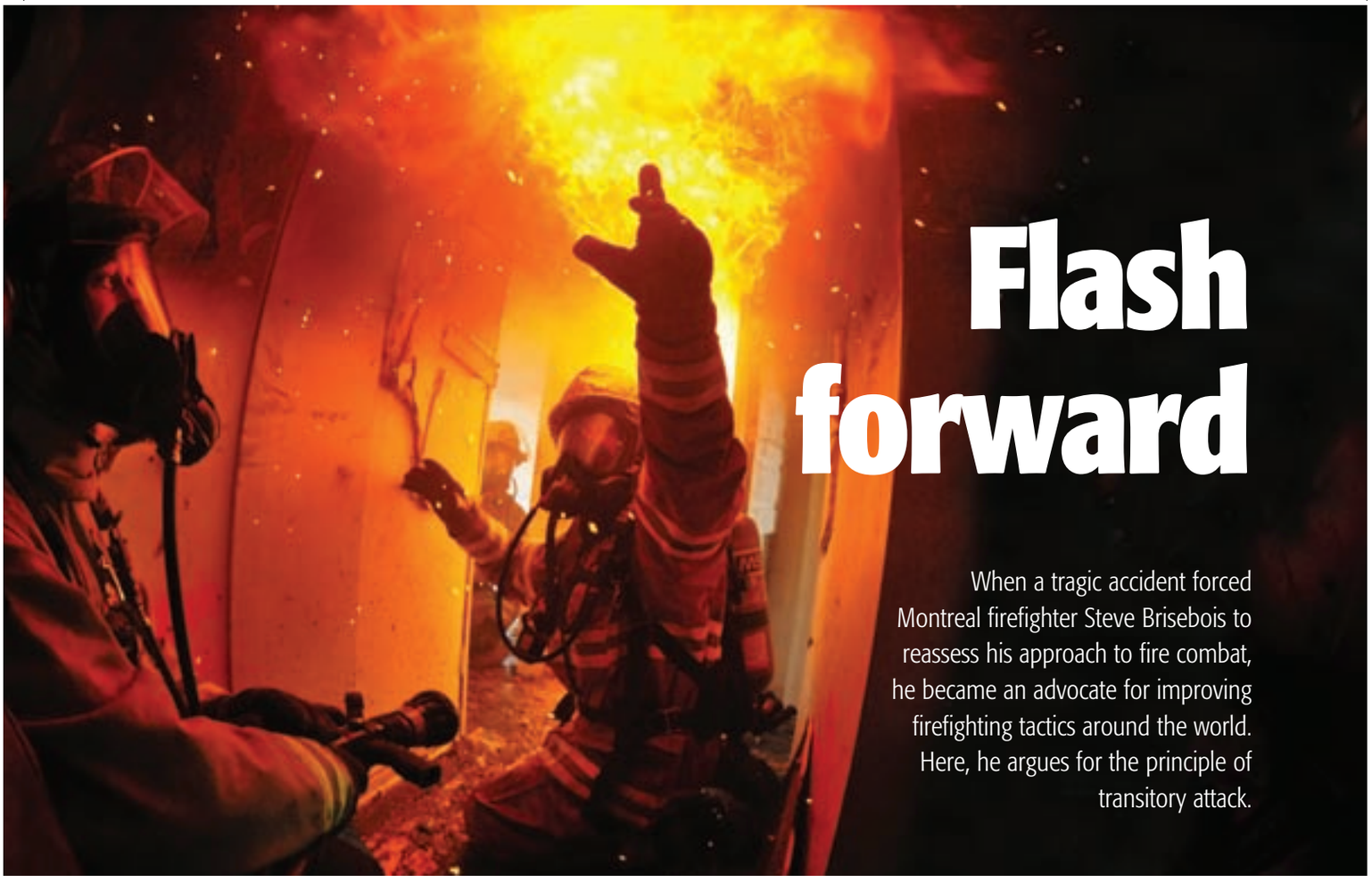


Flash forward

When a tragic accident forced Montreal firefighter Steve Brisebois to reassess his approach to fire combat, he became an advocate for improving firefighting tactics around the world. Here, he argues for the principle of transitory attack.

My career as a firefighter started when I was still in the fire academy. I was going through training in a fire station when we were called out to a fire in a shop. Upon arrival, smoke was coming out of the building but there were no flames visible from the outside. We proceeded with a forced entry to get inside the building, however, the open door meant a constant flow of air, permitting a faster evolution of the fire. Rollovers appeared over our heads and the heat suddenly became unbearable. The outside temperature was around -35°C (-31°F), which caused the fire hose to freeze up. Unable to hose down the fire, there was a flashover, which forced us to quickly withdraw.

Fortunately, my colleagues and I were lucky enough to get out of that ordeal with only light burn injuries. However, the incident left me baffled by the tactics that were used to fight the fire, even though we had done exactly as we had been taught to do at the academy.

The incident inspired me to increase my knowledge of thermally-induced reaction and I took advanced courses on the subject throughout Canada, the United States, and even in Europe. In the meantime, I became a fire simulator instructor for my own fire service and at the fire academy, where I met other firefighters who shared my doubts about our fire tactics. Most sadly, in 2006, our knowledge was tested further when we lost one of our colleagues, Captain Marleau, who died in a fire after there was a fire gas ignition, a phenomenon that was unknown to us at the time.

It was with the aim of sharing our knowledge that, in 2011, my long-time partner and I founded the company Flash Formation. Our first book, *Thermally-induced reaction during a structural fire*, sold more than 6,700 copies in Quebec and France, which demonstrates that there is a real desire among our fellow firefighters to learn more about this subject.

With the help of the Mirabel Fire Department, a city located just north of Montreal, Flash Formation carried out a full week of training on scientific acquired-structure burns.

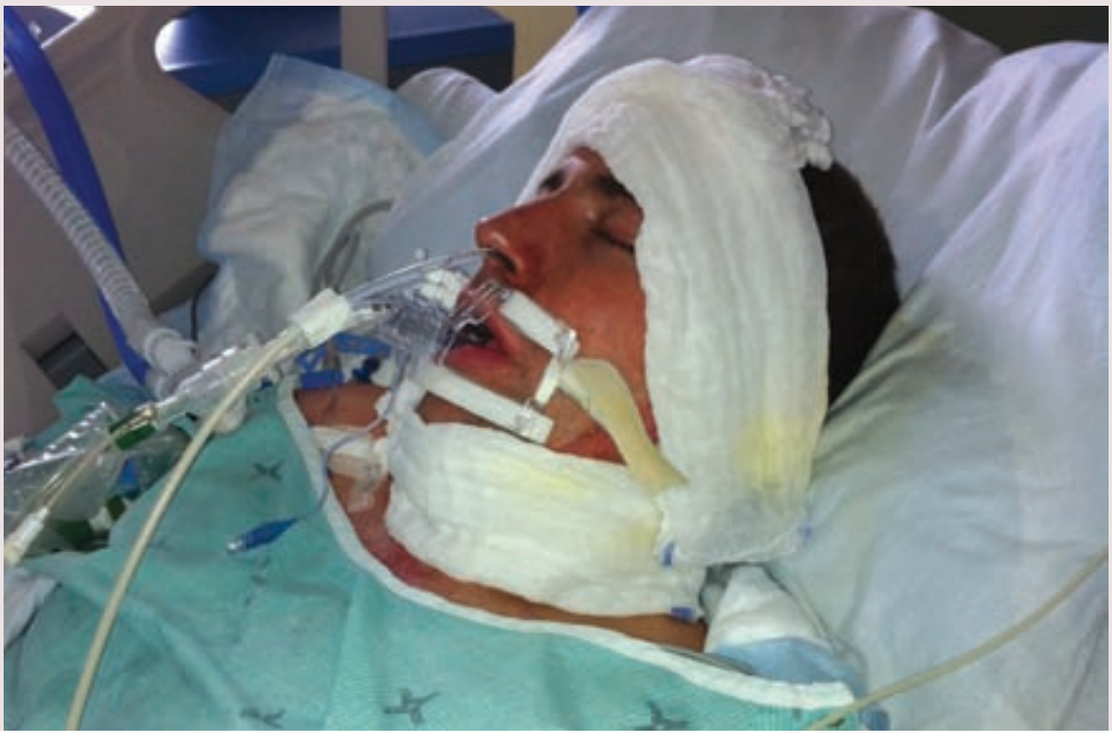
A dramatic accident

On the night of 21 May 2012, my colleagues and I were called to a house fire near our station. Initially the situation seemed fairly secure, but it quickly became very dangerous.

While we were looking for the point of origin of the fire, the room I was in was set ablaze after a flashfire. My two colleagues succeeded in getting out of the room by a nearby door. Since I was a little deeper inside the room, I immediately grabbed the fire hose to protect myself, and called for help on my radio. Intending to come to my rescue, one of my colleagues pulled the fire hose, disconnecting the pressure-reducing valve from my face mask. I then inhaled hot gases, burning my airways. I managed to successfully reinstall my pressure-reducing valve but, as I was trying to get out of that room, I fell into a stairwell hidden behind the door. This proved to be the point of origin of the fire.

As a result of this incident, I suffered first and second degree burns to 67% of my body and 16% of my airways. I was put in a chemically-induced coma for several days because of the risk of complications to my lungs. Fortunately, after a year of treatment and operations, I was able to return to service.

After that accident, I knew that we had to step up our efforts at Flash Formation to share the knowledge we had gained throughout the years so that my experience could serve



Firefighter Steve Brisebois suffered first and second degree burns to 67% of his body and 16% of his airways after an accident in a structural fire.

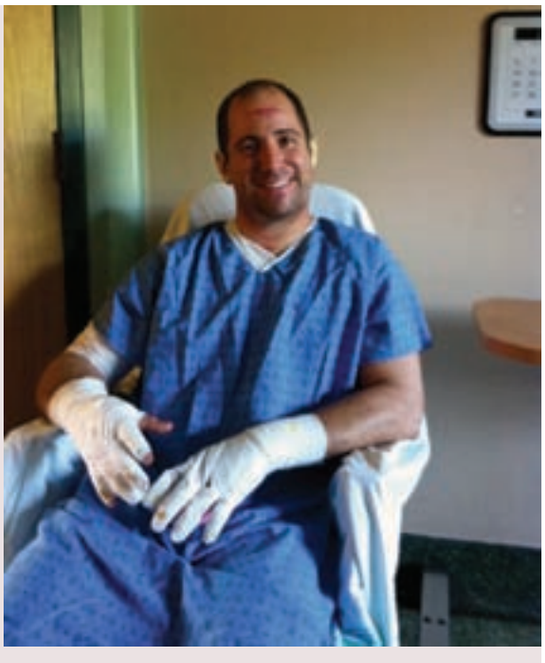
others. To this end, we developed a 45-hour training programme for optimising firefighting tactics. However, to successfully convince other firefighters to change their tactics, we knew we would need solid proof that the procedures we proposed were not only effective but essential.

With the help of the Mirabel Fire Department, a city located just north of Montreal, we carried out a full week of training on scientific acquired-structure burns, which helped us to measure the appearances of the fire. These acquired-structure burns were fully analysed with the help of thermocouple sensors, thermal cameras, a film crew, drones, and detailed radio communication recordings.

The experiments included the practice of transitory attack, which in Quebec at the time was an unknown firefighting procedure. A transitory attack involves putting water onto the fire as quickly as possible from the outside of the building prior to entry. For many firefighters, this technique was in complete opposition to what they had been taught and how they had been fighting fires for their entire careers. The results of these experiments – one of which is outlined below – were a revelation.

Acquired-structure burn project, scenario 2, Unimin Mirabel 2014.

- 3m x 3m room
- Normal combustible charge present in the room
- 30-second water application with a 473lpm (125 gpm) nozzle with a cylindrical pattern
- Thermocouple sensors at three feet and seven feet above ground



The accident prompted Brisebois and his partner to found Flash Formation, a training company that focuses on teaching the latest fire dynamics science as well as the transitory attack principle.

This experiment was carried out to determine reignition times after a transitory attack. The temperature inside the room was over 925°C (1,697°F) before water application from the outside of the building. In this scenario, we used a 30-second water application with a 473lpm (125 gpm) nozzle, for a total of 234 litres (62 gallons). Following the transitory attack, we observed that the temperature in the room at seven feet above the ground had gone from 920°C (1,688°F) to 60°C (140°F), and from 850°C (1,562°F) to 45°C (113°F) at three feet above the floor.

After four minutes, the temperature at seven feet above the floor had increased again to 700°C (1,292°F) and at three feet above the ground to 170°C (338°F). From these results, it can be argued that this technique could allow a rescue operation to gain precious time under less dangerous conditions.

It is important to note that the thermal cameras placed in the hall showed no signs of fire propagation. The firefighters who stood in the hall felt no increase in temperature and observed a neutral plane from the smoke, which eased their movements.

The same results were observed during an acquired-structure burn led by UL. Measures of carbon monoxide and oxygen taken during a transitory attack demonstrate that the

application of water from the outside of the building can successfully reduce the concentration of carbon monoxide at ground level, and help increase the level of oxygen available to possible victims.

In conclusion, transitory attack should definitely be a recommended tactic for firefighting. However, in North America, control of ventilation is still advocated. By contrast, in most European countries, transitory attack has become not only an established tradition but an essential tactic.

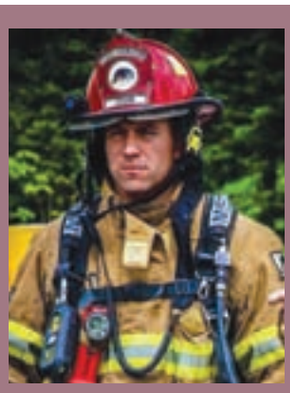
Continual evolution

At Flash Formation our aim is a constant improvement of firefighting tactics, and to this end we have worked with many different organisations around the world. We are always on the lookout for new firefighting techniques and we learn about them during training sessions and seminars.

Since 2012, Flash Formation has spent a total of 37 days practising acquired-structure burns according to the NFPA 1403 standard, and 131 educational acquired-structure burns scenarios have been carried out in 17 fired buildings. We were selected by IFSTA to write the manuals *Strategies and tactics* and C*ompany officers,* and were a part of the validation expert commitee during the project *Study of the impact of fire attack utilising interior and exterior streams on firefighter safety and occupant survival* in the UL laboratories near Chicago, US.

Fire has evolved. It does not have the same propagation speed as it did 30 or 40 years ago. Nevertheless, our firefighting tactics have not changed. They have not followed the evolution of modern fires. Our mission is to convince firefighters and officers of the need to improve fire tactics and firefighting. I don't want any other firefighter to suffer as I did, especially when this kind of accident can be avoided.

ABOUT THE AUTHOR:



Steve Brisebois is an acting captain with the Montreal Fire Department. Since 2002, he has been an instructor on the flashover simulator for the Montreal Fire Department, IPIQ (Quebec's public fire academy), and the Blainville Fire Department training centre.

Brisebois wrote the training manuals on fire behaviour and thermal phenomenon for the Montreal Fire Department and two of Quebec's fire academies, IPIQ and Académie Des Pompiers, and served as a consultant for the Blainville Fire Department on the purchase of a flashover simulator.

In 2011 Brisebois wrote the book Le phénomènes thermiques de l'incendie de bâtiment *and co-founded the company Flash Formation. He did an internship in Bordeaux, France, and Borden, Canada on how to interpret fire behaviour and the use of flashover simulators.*

In 2014, he was selected for the committee of IFSTA's initial response strategy and tactics book. In 2015, he was selected for the fire attack UL FSRI technical panel.