The Halifax Explosion
6 December 1917

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US Department of Health and Human Services
Overview/The Highlights

The Event:
- Collision and Explosion of Ammunition Ship Mont Blanc
- “Largest man-made explosion prior to atomic weapons”
- Appx. 1500 Killed outright. >2000 total dead. >6000 injured
- Massive Canadian and northeast US Response
- Long term recovery efforts

Issue/Information Areas/Areas of Interest:
- Disaster Management
- Red Cross Operations
- Mutual Aid
- Recovery
December 6, 1917. Halifax, Nova Scotia. A munitions ship bound for the war in Europe collided with a vessel in the Narrows of the harbor, triggering a catastrophic explosion that destroyed much of the city. Within minutes a tsunami engulfed parts of the waterfront. That evening a blizzard buried Halifax, isolating it from the world…

http://www.cbc.ca/halifaxexplosion/

http://www.halifaxexplosion.org

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1955605/

http://www.americanancestors.org/Tree.aspx

http://military.wikia.com/wiki/Halifax_Explosion
Apologies

• Only enough time/space to briefly mention some of the many organizations involved

• No way to judge nor any intent to judge relative responses from various organizations

• Use of quotes throughout
Recent Disasters (US) and Red Cross Planning
San Francisco – 1906 Earthquake (3000 fatalities and 80% of the city destroyed)
Chelsea, MA – 1908 Fire

Titanic (1912)

Technology of the time
Communications – Ship and Land
Travel

WWI
Wartime port operations and rules in Halifax
Halifax – Reception/Staging for wounded soldiers
Mass. Public Safety Committee and Volunteerism

Winter

Politics
Relations with France (Mont Blanc – French ship)
Canadian Navy (10 years old)
Distances (Current Road Travel):
Fredericton  436 km/271 miles
Quebec  1023 km/636 miles
Montreal    1245 km/774 miles
Boston   1062 km/660 miles
Mont Blanc
The Mont-Blanc
French general cargo and munitions ship
320 feet long, 44.8 ft wide, with a depth of 15.3 feet.
Gross tonnage of 3121 tons, with a net cargo capacity of 2252 tons.
Crew - 41 French sailors.
The freight manifest for *Mont-Blanc*

<table>
<thead>
<tr>
<th>Explosives</th>
<th>Quantity</th>
<th>Value in 1917 US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNT</td>
<td>226,797 kg</td>
<td>$240,750</td>
</tr>
<tr>
<td>Wet picric acid</td>
<td>1,602,519 kg</td>
<td>$2,230,999</td>
</tr>
<tr>
<td>Dry picric acid</td>
<td>544,311 kg</td>
<td>$960,000</td>
</tr>
<tr>
<td>Guncotton</td>
<td>56,301 kg</td>
<td>$65,165</td>
</tr>
<tr>
<td>Benzol</td>
<td>223,188 kg</td>
<td>$104,376</td>
</tr>
</tbody>
</table>

**Totals**  
2,653,115 kg  
$3,601,290

Source: *Ground Zero: A Reassessment of the 1917 Explosion in Halifax Harbor*

- * + Deck Gun Ammunition
  - $2,653,115kg = 5,849,117.35 lbs. = 2,924.59 tons
The Imo

Gross tonnage of 5043 gross, with a net tonnage of 3161 tons.
430.7 feet long, 45.2 feet wide, with a depth of 30.3 feet.
Crew of 39
3KT Nuclear Blast Estimate. 2016

http://nuclearexcitement.com/nukemap/

NUKEMAP 2.42 FAQ

Effects radii for 3 kiloton surface burst (smallest to largest): ▼
- Fireball radius: 120 m (0.05 km²)
  Maximum size of the nuclear fireball; relevance to lived effects depends on height of detonation. If it touches the ground, the amount of radioactive fallout is significantly increased.
- Air blast radius (20 psi): 310 m (0.31 km²)
  At 20 psi overpressure, heavily built concrete buildings are severely damaged or demolished; fatalities approach 100%.
- Air blast radius (5 psi): 0.66 km (1.37 km²)
  At 5 psi overpressure, most residential buildings collapse, injuries are universal, fatalities are widespread.
- Thermal radiation radius (3rd degree burns): 0.82 km (2.13 km²)
  Third degree burns extend throughout the layers of skin, and are often painless because they destroy the pain nerves. They can cause severe scarring or disfigurement, and can require amputation. 100% probability for 3rd degree burns at this yield is 7.7 cal/cm².
- Radiation radius (500 rem): 1.01 km (3.23 km²)
  500 rem radiation dose; without medical treatment, there can be expected between 50% and 90% mortality from acute effects alone. Dying takes between several hours and several weeks.

Note: Rounding accounts for any inconsistencies in the above numbers.

Estimated fatalities: 2,180
Estimated injuries: 6,650

In any given 24-hour period, there are approximately 22,256 people in the 1 psi range of the most recent detonation.
Immediate Impact:

Explosive force (studied by Oppenheimer), Mont Blanc (gone), Tsunami
Ships sunk/damaged (Imo)
Rocks ...

Fires, Search and Rescue, Communications Cut, Roads Disrupted, etc...
Lots of individual stories

“For almost two square kilometers around Pier 6, nothing was left standing. The blast obliterated most of Richmond: homes, apartments and business... “

“On the Dartmouth side, Tuft's Cove took the brunt of the blast. The small Mi'kmaq settlement of Turtle Grove was obliterated.”

Twelve thousand buildings were severely damaged in the Explosion. 1630 were completely destroyed.

German Attack?
fireball height = 1.2 miles

radius of water evaporated = 20 ft.

tsunami radius = 1 to 3 miles

tsunami height = 60 feet

temperature = 9000°F

air blast > 756 mph

Mont Blanc’s 6,880,627 lb. iron hull tossed upward 1,000 ft.

blast yield = 3 kilotons

sonic boom = 13,320 mph

carbon-saturated “black rain” fell for 10 minutes
"Buildings within a radius of half a mile of the explosion were totally destroyed and that up to one mile they were very largely rendered uninhabitable and dangerous. No section of Halifax city escaped serious damage… More or less severe damage was caused as far away as Sackville and Windsor Junction, 9 or 10 miles (away from) the explosion… At Truro, 62 miles, and New Glasgow, 78 miles, the shock was sufficient to jar buildings very appreciably, and even to shake articles from shelves. Even as far away as Charlottetown, 135 miles, and North Cape Breton, 225 miles, the explosion was distinctly felt or heard."

Source: Prof. Howard Bronson of Dalhousie University, in a paper for the Royal Society of Canada, 1918.
"... but at 11:30 politicians and citizens both convened an emergency meeting. ... Colwell, Grant, MacIlreith, and five members of the council agreed on creating five instant committees: transportation, food, housing, finance, and mortuary. At quarter after twelve the meeting adjourned until 3:00 p.m. "

MacDonald Page 102
Hospitals

“Halifax had four public, four military and seven private hospitals in 1917. They ranged in size from a few dozen to 200 beds, and they were soon overflowing. The main civilian hospital in Halifax was the Victoria General.

Behind the Citadel, Camp Hill Hospital had just been built for convalescent soldiers.”

“As the days passed, temporary hospitals were set up at various locations like the YMCA, the Halifax Ladies’ College and the Academy of Music.”
Blinded Personnel

Fully Blinded 41  Half-Blinded  249

“A joint committee of the American Red Cross and the Halifax School for the Blind was appointed ... 

At their suggestion, Miss Lotta S. Rand of the Massachusetts Commission for the Blind was invited to go to Halifax for three months at the expense of the Red Cross for the purpose of directing the follow-up work and devising further means of training and education.”
American Red Cross Disaster Preparation

“... after being caught unawares in San Francisco, the Red Cross made disaster relief first a national priority, and then experimented with organizing local disaster relief committees. Boston and New York set up the first two committees.

“Tasked” and requested by President Roosevelt
Response and Rehabilitation Phases in Disaster Handbook

New York was already rushing the first of several trains to Halifax, filled with twenty engineers, doctors, nurses, $15,000 worth of tools, $150,000 worth of lumber, one thousand portable houses, and thirty thousand pounds of bandages.”
Massachusetts Committee on Public Safety

- First of its kind in the US (Sworn in Feb 10, 1917)
- Highest level of Government and Private leaders of the community
Massachusetts Response

“The committee reached out to the banks, the railroads and the universities that were represented on its board. Harvard University emptied its medical school and, with the Red Cross, packed up the makings of portable surgical suites. Nurses from the hospitals were recruited. Cash was assembled from banks.”

“The Massachusetts Halifax Relief Committee raised one million dollars for supplies and relief efforts, an amount equal to $20 million today. “
Abraham Ratshesky – leader of Massachusetts relief effort

- First Boston relief train departed North Station 6 December 10:17 p.m.
- 11 doctors, 10 nurses, journalists, Red Cross plus supplies
- Arrived in Halifax 7 a.m. on Saturday, December 8  (delayed by snow storm)

http://www.ratsheskyfoundation.org/
Second Boston Train

- Harvard Hospital Unit (designed for European employment)
- 500-bed hospital
- “only unit to arrive in Halifax with its own complete nursing staff of sixty-five women and five men.”
Gov. McCall of Massachusetts visiting
Recovery (Rehabilitation)

• “... Christian Lantz, who was in charge of Chelsea rehabilitation, to come to Halifax to consult.”

• Deliberate plan for urban renewal
Halifax Relief Commission

- Sworn in on January 22, 1918
- Divided into four areas: rehabilitation, reconstruction, medical, and finance.
- Distributed Pensions to victims
- Remained in operation until 1976.
Selected Donations:

<table>
<thead>
<tr>
<th>Location</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>$250,000.00</td>
</tr>
<tr>
<td>Chicago</td>
<td>$125,000.00</td>
</tr>
<tr>
<td>Ontario</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>The UK</td>
<td>$1M</td>
</tr>
<tr>
<td>London</td>
<td>$600,000.00</td>
</tr>
<tr>
<td>The British Red Cross</td>
<td>$125,000.00</td>
</tr>
<tr>
<td>King George V</td>
<td>$5000.00</td>
</tr>
</tbody>
</table>

* Total Donations approximately $30 million
Individual Assistance

“A claims department was set up to deal with fifteen thousand claims for furnishings and clothing worth less than $100. Of the 328 streets in Halifax, claims were submitted from 229. Claimants were allotted ten minutes to make their case and checks were issued immediately upon the decision.”
Orphans

• Orphan committee dealt with 500 children

• 70 children lost both parents. 120 lost their mothers, and 80 lost their fathers.

• Of the 120 children who had lost their mothers, only 9 had fathers in Halifax. The fathers of the other 111 were all serving overseas.
Halifax Temporary Morgue
Mass Funeral
Monday, December 17, 1917

Halifax explosion 1917

City of Toronto Archives, Fonds 1244, f1244_it2453
TO THE MEMORY OF
THE UNIDENTIFIED DEAD
VICTIMS OF THE GREAT DISASTER
DECEMBER 6, 1917
“The official enquiry opened less than a week after the explosion. The captain and pilot of the Mont-Blanc and the naval commanding officer were charged with manslaughter and released on bail. Later the charges were dropped, because gross negligence causing death could not be proved against any one of them. In the Nova Scotia District of the Exchequer Court of Canada in April, 1918, the Mont-Blanc was declared solely to blame for the disaster. In May, 1919, on appeal to the Supreme Court of Canada, both ships were judged equally at fault. The Privy Council in London, at that time the ultimate authority, agreed with the Supreme Court's verdict.

Thus no blame was ever laid …”