Going In-Seine with the Bane of Frozen Rain:

Dealing with a Major Flood and Snowstorm Scenario in the French Capital

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Seine river flood peaked at 5.84m more than 4 meters up to normal level

The Alma bridge “Zouave” * lookout

The second rainiest period since 1910
A major problem?

* Colonial Infantry during the Crimean war 1853
At the end of January 1910, the Seine river reached the level of 8.62 m.
A major disaster for France: No victims but around 2 billions cost in today’s money.
Water infiltrated thousands of buildings and hundred of streets through the new sewer system and metro tunnels.
Inside the Paris Hospitals
January 1910

• Evacuations
• Improvised care organization
The lessons of 1910 were used to prepare the city and the hospitals for the winter floods.

Protection by giant spillways upstream of Paris.
Contingency Plan
Levels of flood readiness in Paris

<table>
<thead>
<tr>
<th>Alerte et prévention</th>
<th>Crues</th>
<th>conséquences</th>
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</thead>
<tbody>
<tr>
<td>8.62 m</td>
<td>1658</td>
<td>1910 8.62 m</td>
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<tr>
<td>7.13 m</td>
<td>1924</td>
<td>1955 7.12 m</td>
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<tr>
<td>6.10 m</td>
<td>1945</td>
<td>1958 6.85 m</td>
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<tr>
<td>6.10 m</td>
<td>1982</td>
<td>2001 6.21 m</td>
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<tr>
<td>5.50 m</td>
<td>2014</td>
<td>6.00 m début d’inondation du RER C des sous-sols</td>
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<td>4.30 m</td>
<td>2001</td>
<td>3.45 m début de la fermeture à la circulation des voies sur berges</td>
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<td>3.20 m</td>
<td>2001</td>
<td>3.20 m fermeture de la voie piétonne « Berges de Seine »</td>
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<tr>
<td>2.50 m</td>
<td>2001</td>
<td>3.45 m début de la fermeture à la circulation des voies sur berges</td>
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<tr>
<td></td>
<td>2018</td>
<td>6.10 m fermeture totale des voies des arrondissements</td>
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<tr>
<td></td>
<td>1945</td>
<td>débordements dans les 4e, 7e, 15e et 16e arrondissements</td>
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<tr>
<td></td>
<td>1910</td>
<td>7.30 m arrivée des eaux par l’amont dans les 12e et 13e arrondissements</td>
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</tbody>
</table>

And the “Zouave” is still there!
Paris Region Civil Defense cell crisis

- Activated at 5.50 m
- 24 – 48 h prevision
- Daily report
- Computer simulation
- Conference call 2/24:
  All the services
Contingency Health Care Plan

• Hospitals
  – in the flood risk area
    • Preventive measures (power supply ...)
    • Emergency actions (partial closure, pumping ...)
    • Decision to evacuate
  – out of the area
    • Support of evacuated hospitals

• EMS
  – maintaining daily activity
  – if needed evacuation of hospitals: up to 300 patients per day
Flood January 2018

5.84m : Level 2 of the plan activated

- Hospital partial closure: One Cyberknife° radiosurgery equipment shut down for a week
- Pumping in the basement of 3 hospitals
- No evacuation

A flood of 4 meters was not a major problem
So proud! But ...
Paris February 7, 2018

A snow storm
Temperature – 2 C°
The largest snow fall since 1987

No snow storm plan
48 hours of nightmare in the Paris region
February 7, 2018: only 15 cm of snow!

- Freeways closed
- 800 km of cumulated traffic jam
- Public transports shut down
- Health care personals unable to reach the hospitals
- Elective orthopedic surgery delayed
- Thousands of trauma victims in the ER

The best joke of the year for the French Canadians!
Climate disasters are changing

- Plan for the worst
  - The major flood
- Prepare to be surprised!
  - By 12cm of snow