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## *Monitoring the Long-Term Performance of the Peace Tower*

### *Objectives*

To evaluate the long-term performance of the Tower and, in particular, the impact of the conservation work on the behaviour of the exterior walls under varying environmental conditions.

### *Background*

The Peace Tower, constructed between 1919 and 1927, is the most prominent structure of Canada's Parliament Buildings. Over the years the exterior masonry deteriorated and cracked. This led to a major masonry conservation project, completed in 1996. Conservation work included grouting the voids between the stone and concrete, repointing all the mortar joints, repairing stones and improving water-shedding details. A comprehensive monitoring program was subsequently commissioned to monitor hygrothermal performance and structural movement.

### *Statement of Work*

IRC researchers have installed sensors on the Tower to measure indoor and outdoor temperature and humidity, heat flow and air pressure. Other sensors measure tilt, movement across former cracks, and movement caused by earthquakes or wind. This complex monitoring system, with more than 190 sensors in total, is now fully operational and providing reliable data.

### *Expected Outcomes*

The installed sensors have provided baseline data on the performance of the Tower's exterior walls under moisture, temperature, wind and vibration loads. They can also show changes such as local frost damage and hairline cracking. Awareness of such changes can provide timely warnings of deterioration, and help identify its causes. The project has also led to a better knowledge of the performance of composite masonry-concrete walls and to improved monitoring techniques that can be applied to conservation planning for other historic buildings.

### *Partners*

Public Works and Government Services Canada, Heritage Conservation Directorate.

### *Start/Expected Completion Dates*

This project began in October 1996 and is ongoing.

### *Project Manager*

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For more information, see [http://irc.nrc-cnrc.gc.ca/bes/hmpe/peacetower\\_e.html](http://irc.nrc-cnrc.gc.ca/bes/hmpe/peacetower_e.html)

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