Climate Data Needs for the Transportation Sector:  
Climate Change Task Force Discussion Paper

- The Transportation Association of Canada (TAC) is a national association with a mission to promote the provision of safe, secure, efficient, effective and environmentally and financially sustainable transportation services in support of Canada's social and economic goals. TAC’s growing network of nearly 550 transportation industry stakeholders and corporate members includes federal, provincial and territorial transportation departments, municipalities, private sector engineering and consulting firms, academic institutions and trade associations.

- Many of TAC’s members have noted that changes in regional climates are already impacting the transportation industry. In addition to mitigating climate change and reducing greenhouse gas emissions, TAC members realize that adaptation solutions need to be developed and implemented as soon as possible in many regions of Canada and that the North has its unique adaptation needs. Because TAC recognizes that climate change is an important issue for all Canadians and that the transportation sector both contributes to, and is affected by climate change, it formed a Climate Change Task Force in April 2008.

- Many short-term and long-term decisions that affect the lives of all Canadians are based on climatic data and analyses provided from Canada’s climate observation network. This network is supported and maintained by Environment Canada. The transportation industry in Canada uses this climate data and analyses from it for project and infrastructure designs, including national transportation design standards supporting public safety.

- Almost all of today’s infrastructure has been designed using climatic design values that have been calculated using historical climate data, assuming that the average and extreme conditions of the past will represent conditions over the future lifespan of the structure. While this assumption has worked in the past, it is becoming less and less valid as the climate changes. Transportation infrastructure must be designed and built to stand for decades and be able to withstand the impacts of changing climate extremes and day-to-day weather far into the future. The changing climate has the potential to impact the safety and longevity of existing transportation structures, to regionally accelerate premature weathering of structures and to change climatic design criteria for codes and standards. Any changes in a regional climate will require changes to how structures are designed, engineered, maintained and operated for the future.

- As the recognized developer of climatic design information for national codes and standards, Environment Canada needs to ensure that the transportation sector and specifically, the Canadian Highway Bridge Design Standard is provided with climatic design values that reflect the most recent climate conditions (e.g. temperatures, extreme rainfalls and extreme winds and ice buildups). The sector also needs climate change modelling and other approaches to consider future climate change. In particular, the transportation sector is seeking scientific guidance from Environment Canada on various projections of the future climate based on
selected outputs from the latest climate change models. TAC members need the scientific expertise and support from federal departments—such as Environment Canada—to properly consider the changing climate, its trends and its implications in design, operation and maintenance of transportation systems.

- TAC members are concerned that many of the climate design values in use for standards are dated and are not being regularly updated to reflect the changing climate. For example, the CSA Canadian Highway Bridge Design Standard (CAN-CSA-S6-06 CSA Standard) used by TAC members contains climatic design information dating from the 1960s. The implication is that transportation industry engineers are currently designing new drainage and other systems without the benefit of recent data and without consideration of the climate conditions that Environment Canada and other scientists have reported to be changing.

- Many of TAC’s members are concerned over recent changes in the quantity and quality of climate data holdings from Environment Canada. Our members highlight increases in the amount of missing data in recent years as well as declines in the number of long-term climate stations. TAC members have also noticed that real-time and archived snowfall measurements are becoming increasingly scarce and that climate records for some measurements, such as short duration rainfall intensities, are not kept up-to-date and sometimes are not available from the National Climate Archives of Canada (maintained by Environment Canada) until years later. The impacts of missing data or gaps in the data record, sometimes covering days at a time, are significant for engineers and practitioners in determining suitable materials for roads or extremes in design of structures. Gaps in the data record and declining numbers of long-term stations also compromise Canada’s ability to track changes in regional climates.

- TAC members are aware that significant amounts of climate data collected by agencies are not included in the existing climate archive and encourage Environment Canada to explore opportunities to augment the existing climate network with this additional data. TAC members are respectful of Environment Canada’s important mandate to nationally quality assure and archive climate data for use by all Canadians.

Disclaimer

While TAC and the authors endeavored to ensure that all information in this briefing is accurate and up to date, they assume no responsibility for errors and omissions.