

Climate Drives Need for Tougher Infrastructure

BY KATE SHIRLEY

The existing transportation infrastructure in the United States was designed and built to withstand a certain range of expected weather patterns and temperatures. Now that weather predictability is going out the window thanks to global warming and climate change, are we prepared to withstand the extreme weather events that are predicted as long as the Earth continues to warm? At the very least, damage to the current system will be costly to repair. The worst case scenario involves compromised safety, leading to injury and possible death. Soon Federal agencies will have to take action to prepare and implement higher design and building standards for transportation infrastructure in order to ensure public safety.

Since the start of the industrial revolution, the amount of energy used by humans has increased exponentially, particularly in the last half-century. Scientists now predict that the global temperature could increase by up to 6°F by the turn of the next century. To date, sea levels have already risen by four to eight inches. And like a snake eating its tail, transportation activity is a direct contributor of the climate change which could weaken transportation infrastructure in the future. With hotter days and longer heat waves, an increase in the number of wildfires will compromise roads, damage pavement and deform rails. Droughts and decreasing snow pack will lower

water levels in many areas, increasing the need for programs to supply water, and crippling shipping routes by impairing freight movement. Infrastructure in low lying coastal regions will be more susceptible to flooding as the melting polar ice caps and glaciers raise sea levels. Increased flooding and storm severity will result in surging waters that



could damage and weaken structures like bridges, roads, levees and dams and impair public transit movement. These impacts will severely inhibit and hinder emergency response readiness and will lead to airport and transit delays. The cost to redesign and replace all this transportation infrastructure will be considerable, but crucial.

In order to avoid these potential disasters and the associated costs, project managers and engineers, when designing and building infrastructure, must weigh the upfront costs of creating fortified infrastructure against the monumental costs of structural failure brought on by shifting weather patterns. A 2008

report by the National Research Council, *Potential Impacts of Climate Change on U.S. Transportation*, calls for major changes to be made in the way transportation planners and engineers design, build and maintain infrastructure projects, to account for larger climate variances. In the low-lying coastal regions, increased focus must be put on constructing solid sea walls and levees.

Airport runways, roads, and freight lines will need to be moved or elevated to protect against flooding. Structures will have to be fortified against fires, and strengthened to withstand vicious storms. It will also be necessary to monitor more closely the condition of vulnerable structures, and to make use of technological advances like sensors to alert engineers when a structure has the potential for failure.

Climate change should always be considered when planning the location of new structures as well, to assure that more vulnerable locations are eliminated.

It will be up to the Federal agencies to take the initiative to research and develop a higher set of building standards to account for the changing climate. Although this step has yet to be taken, local governments and private firms alike should begin to collaborate with climate experts to assess potential issues with both future and existing projects. Once this commitment is made, it will go a long way toward increasing the safety and security of the national transportation network for years to come.