

PROJECT PROFILE



Fremont Bridge Structural Health Monitoring System Portland, Oregon

Client:

Oregon Department of Transportation

The Fremont Bridge structural health monitoring (SHM) system was designed for ODOT by Engineered Monitoring Solutions. The monitoring system is part of a larger statewide SHM program which incorporates a number of bridges with different monitoring objectives. The Fremont Bridge is the I-405 and Highway 30 crossing of the Willamette River in Portland, Oregon. This bridge is a steel tied arch bridge and has the longest main span of any bridge in the state of Oregon. Visual evidence of thermal strain in the tie girders due to temperature fluctuations is evident.

Engineered Monitoring Solutions completed the design of the monitoring system and is currently installing the system. ODOT undertook this project to improve the ability

to monitor the structural performance of the bridge under temperature changes. The monitoring system will collect data regarding strain in the tie girder diaphragms, surface temperature, air temperature and relative humidity and wind speed and direction.

A series of Measurement and Control Units (MCUs) will be programmed to collect the data, perform calculations to process the data, and store the data until it is automatically loaded into the state-wide SHM database. The MCUs will be installed at 8 sections along the tie girders on both sides of the bridge. The network of MCUs will use wireless technology to communicate with each other and a gateway MCU that is connected to the ODOT wide area computer network.

The data will be transmitted from the gateway MCU at the bridge to the SHM data management tool through a wide area computer network connection. The processed data will be loaded into the database hourly for review by Bridge Engineering personnel using a web browser.

