Mission Matters

Prof's Alaska pipeline work withstands quake

When he got news in November that a 7.9-magnitude earthquake had struck Alaska, SCU civil engineering professor Sukhmander Singh did some shaking of his own.

Thirty years ago, he was the senior project engineer in charge of evaluating the seismic stability of soils on which the 800-mile Trans Alaska Pipeline was being built.

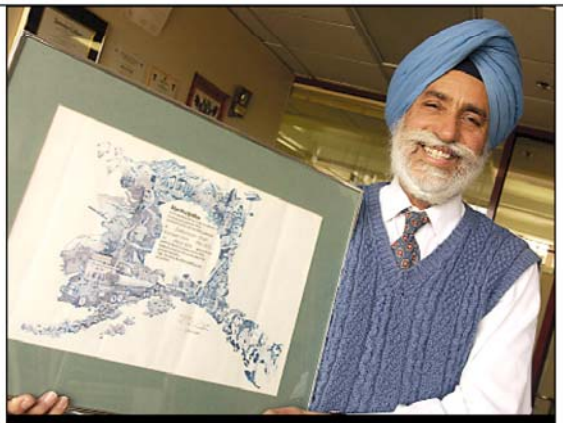
"I was scared when I heard about the earthquake. I hoped I wouldn't hear that there was large-scale liquefaction. If the pipeline had failed, I would have lost sleep for months," Singh says. "Fortunately, our design held up."

The 48-inch diameter line, which carries about a sixth of the United States' oil production, was shut down while crews checked for damage. Some pipeline supports were damaged and sections of the pipeline moved up to seven feet, but there were no leaks.

Singh says he is gratified to know that his work as a young engineer for Dames and Moore has held up all these years.

From 1974 to 1976, Singh and other engineers, geologists, and thermoconductivity experts did a mile-by-mile evaluation of the soil on which the $8 billion pipeline would rest. The team went a half-mile in each direction from the pipeline's proposed path, checking the potential for soil instability.

They were dealing with unique conditions: temperatures well below zero, permafrost (rock or soil that has been frozen two or more years), and ground that would freeze, thaw, then freeze again. Plus, there was the threat of earthquakes and expansion of the pipeline when the temperature of the crude oil passing through it changed.



Engineering Professor Sukhmander Singh holds a certificate of appreciation he earned for his work ensuring that the Trans Alaska Pipeline would remain seismically stable.

CHARLES BARRY

When you're dealing with earth, you can't know "inch by inch" how it will react to construction, Singh says. During the round-the-clock construction of the pipeline, Singh recalls being summoned to a site 150 miles away when construction crews encountered unexpected soil conditions. If conditions differed from the report done in advance of the construction work, Singh and other engineers drove or were flown to the site and made engineering change recommendations on the spot.

Singh emphasizes to his civil engineering students at SCU that it is important that they gather knowledge beyond the bounds of the textbooks that they read on campus.

"It's extremely important for an engineer to have an appreciation for real-life situations," Singh says. "Your success lies in your ability to understand the departure between the idealized book knowledge and actual conditions. We also must know how to handle what nature is telling us."

Working in Alaska, Singh adds, "taught me to deal with people in a place that was so different than I was used to. I was lucky to have worked there. It was a good experience that taught me a lot. I share it with my students all the time."

Singh considers his years in Alaska rewarding. "I learned a lot about the Alaskan people and the respect we must have for a natural setting whenever we build on something," he says. "It was a humbling experience to see the beauty and enormity of the space."

While in Alaska, Singh taught a graduate engineering course at the Anchorage and Fairbanks campuses of the University of Alaska. He smiles now when reminiscing about how a native of sun-baked India was teaching students about soil conditions in a country where a temperature 20 degrees below zero is common.

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Singh earned a Ph.D. from the University of California, Berkeley in 1979 and has worked at SCU since 1986.

For more information, see www.alyeska-pipe.com.