OUR OCEAN BACKYARD

ARTICLE NO 291

Conquering Waddell Bluffs

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It was 178 years from the time the Portola expedition clawed their way up the coast in 1769 until the California Department of Highways was able to build a permanent road across the base of Waddell Bluffs. Waiting for a low tide and racing across the beach in a stagecoach or a Stanley Steamer was the only option for getting across the bluffs for years.

The state of California acquired the land along the bluffs in 1933 but spent the next eight years trying to figure out a road design. World War II delayed the construction, which finally began in 1947 and was completed the next year. About a million cubic yards of loose rock (approximately 100,000 dump truck loads) were excavated from the base of the bluff and used as fill to create a flat roadbed along the shoreline. About 600 feet of riprap was placed at the edge of the roadway to protect the area of highway most exposed to wave attack.

This rock did the job until the intense 1983 El Niño winter when elevated sea levels and repeated attack by large waves at times of high tides removed some of the loose rock and fill that was protecting the 2000 feet of highway at the south end of the bluffs. CalTrans had to bring in twenty-four thousand tons of rock to save Highway 1 that year.

The completion of the highway in 1948 did nothing, however, to stop the bluffs from failing and rocks and debris from sliding and rolling downslope towards the newly opened Highway One.

“Watch for falling rocks!” Do you ever notice that sign just as you cross the bridge over Waddell Creek and start into the stretch of Highway 1 below the overhanging cliffs? I’ve never been exactly sure what a driver is supposed to do if they see a large falling rock heading towards your car.

The original plan for dealing with falling and rolling rocks at Waddell Bluffs was based on some field experiments done by the Colorado Department of Highways, which has many unstable road cuts of their own to worry about. The Colorado engineers did something that seems unusual for engineers who are traditionally very quantitative. They actually rolled large rocks down hillsides of different slopes to determine what kind of barrier could halt those rocks. This must have been an interesting experiment to watch.

For very steep slopes such as those at Waddell Bluffs, they determined that a debris trench about 15 feet wide, four feet deep and filled with gravel, with a two foot berm separating the trench from the roadway would stop rocks. And the trench did work for a number of years. Rock and debris from the 400-foot high bluffs falls almost continuously, however, and the trench filled up quickly during wet winters.

At least initially, CalTrans road crews would periodically inspect the trench, and when it started to get full they would usually send out a front end loader and clean out the trench. The crews apparently didn’t always like to work in the wet winter months, however, and the trench often was full of debris from the overlying bluffs for extended periods of time. As a result, the engineered trench became a launching ramp for large boulders careening downslope at high velocities from the bluffs above.

I was involved in a lawsuit in 1976 against CalTrans resulting from the death of a passenger in a tow truck when a two hundred pound boulder, which had rolled down the slope, went through the front window of the truck. The lawsuit accused CalTrans of inadequate maintenance and debris removal from the trench.

In order to reduce future liability to the approximately 280,000 vehicles that traverse the highway each year, the state was required to remove the accumulated rock debris regularly, and also install a steel wire rope barrier system at the edge of the roadway to halt any large fugitive rocks that might escape the trench.