

DAVID J. BERTI, P.E., S.E.

SENIOR CONSULTANT

For the past 29 years, Mr. Berti has been an engineering consultant to owners, contractors, and engineers for the design of heavy construction facilities. His design experience includes tunnels, shafts, land and marine cofferdams, pipe jacking and microtunneling, subway construction, caissons, retaining walls, open excavations, powerhouses, temporary dams, equipment trestles, temporary railroad and highway bridges, permanent bridge foundations, temporary bridge shoring supports, concrete falsework, work platforms, rigging, pipelines (hydraulic and structural), temporary excavation shoring, permanent slope repair, and demolition of various structures. Prior to becoming a consulting engineer, Mr. Berti was a project and field engineer and survey party chief for two heavy construction contractors building the subway system in Washington, D.C. He is a registered Civil Engineer in numerous states and a registered Structural Engineer in California.

Years of Experience: 29

Years with Brierley: 1

Education

B.S., Mechanical Engineering
Pennsylvania State University, 1970

Graduate and Undergraduate Study
in Civil Engineering, George
Washington University, University of
California, Berkeley, and University of
Alaska Fairbanks

Professional Registration

Professional Engineer: California,
Maryland, Alaska, Massachusetts,
Washington, Illinois

Structural Engineer: California,
Hawaii

PROJECT EXPERIENCE

Islais Creek Clean Water Projects, San Francisco, California

Working for the City of San Francisco City Engineering Bureau, was involved in the design all six contracts on the system. Advised the City on construction methods and was responsible for the complete design of Islais Creek Contract 'E', including a tunnel in squeezing Bay Mud that was driven beneath the main line railroad tracks, and SPTC slurry walls with jet grouting, incorporating the temporary support into the permanent structure. For Contract 'E', reviewed numerous tunnel construction methods, including ground freezing, microtunneling and canopy spiling before choosing compressed air for tunneling. Analyzed and approved the Contractor's requested change from compressed air to jet grouting for tunnel face support. Also was in charge of the design of the 65-foot deep shoring system installed in order to construct the Rankin Pump Station for the Islais Creek system. Designed the reinforced concrete substructure supporting a replacement main line railroad bridge at Army Street crossing, and designed the shoring for excavation beneath the existing bridge.

WMATA E-1a Subway

Designed bridge decking and earth support system for this subway station and line section in Washington, D.C. Slurry walls were used to construct a 66-foot deep cut in an urban area. Designed support for a 72-inch PCCP concrete high-pressure water line, which provided primary water supply for the city.

Metro Eastside LRT Project – Tunnel and Station Excavations, Los Angeles, California

Designed cross-lot braced and tied-back soldier pile and lagging excavation shoring systems and the supported temporary street decking for excavations up to 60 feet deep in a crowded urban environment for two new subway stations and portal structures.

SCCRA Anaheim to Santa Ana Second Main Track Addition, Anaheim, California

Working for Shimmick Construction, designed a scheme for removing old railroad bridges and rolling in new bridges on shoring bents over a single weekend outage for a railroad upgrade project. For the larger setup the 3-span railroad bridge was rolled into final position on Hilman rollers as a single, 350-foot long unit. Berti was in charge of all design work, including the foundations and temporary falsework that supported the new bridges during construction and rolling operations.

Caltrans' Seventh Street Seal Slab, Oakland, California

For the soil-cement sub-contractor on the Cypress Freeway retrofit project, developed a method of analysis to design 28-foot maximum deep tied-back shoring walls below the water table with single level of tiebacks located near the ground surface. Was in charge of all design for the completed project, which also included shafts adjacent to BART and earth dams using a soil-cement cutoff core. Project received the ASCE Golden Gate Chapter Project of the Year Award.

Golden Gate Bridge South Approach Retrofit

Working for Shimmick Construction, is analyzing all contractor work activities that entail bridge removal and is providing detailed drawings and computations for all engineered contractor activities. The project entails the retrofit of the south approach to the Golden Gate Bridge, and includes work on the two large reinforced concrete pylons, the Fort Point Bridge Arch and its foundations, the cable Anchorage Housing, the bridge deck, and the approach spans.

Inland Feeder Arrowhead East and West Tunnels Project, San Bernadino, California

Designed the 12-foot inside diameter pipe lining to resist external hydrostatic heads of up to 1100 feet, with zero infiltration or exfiltration. Developed design criteria and methodology of analysis for this new type of pipe and for the alternates of unstiffened and stiffened steel linings, including joints and cellular and regular concrete backfill that to be placed outside of the pipe. The new pipe consists of reinforced concrete that is connected to an external steel cylinder with headed studs. Analyzed the pipes for all loading conditions, including seismic.

Inter-Island Tunnel, Boston, Massachusetts

Was in charge of the design of the temporary and permanent support for this 25,160-foot long tunnel with access shafts at each end. The tunnel is complete under Boston harbor. The 11-foot inside diameter tunnel varies in depth between 230 feet 300 feet below the harbor water surface and carries a maximum of 360 mgd of sewage from Nut Island to the treatment plant on Deer Island.

The Río Piedras Contract of Tren Urbano, San Juan, Puerto Rico

Developed many of the construction concepts as well as the design parameters for the stacked drift tunnel on the Tren Urbano subway design-build project in San Juan, Puerto Rico. Also performed review and assisted in the design of the shoring and tunnel breakouts for the shafts. The contract is a 1500 meter long subway that includes two underground subway stations and connecting tunnels. The Río Piedras Station is one of the largest diameter soil tunnels ever constructed, built using a stacked drift scheme, in which the tunnel lining of 15 concrete-filled drifts forms a horseshoe-shaped compression arch. In addition, four tunnels were constructed by the New Austrian Tunneling Method (NATM). Twin bore tunnels were excavated with an earth pressure balance machine (EPBM), in conjunction with a "one-pass" watertight precast concrete segmental lining system.

Metrowest Pressure Tunnels, Boston, Massachusetts

Conducted analytical studies on the interaction of rock and reinforced concrete and steel linings in the Boston MetroWest pressure water tunnel. Performed Technical oversight of the design computations for the tunnel lining.

BART-to-SFO Extension Project, San Francisco Peninsula, California

Working for Peninsula Corridor Joint Powers Board (PCJPB), provided independent design review of structures to be constructed within the PCJPB (previously Southern Pacific) zone of influence. Reviewed permanent structure design criteria and permanent underground BART structures for conformance with PCJPB and AREMA Railroad requirements.

Lower Northwest Inceptor Pump Stations Project, Sacramento, CA

Designed cofferdams for the construction of the large New Natomas and South River Pumping Stations. The plan dimensions of the primary portions of the two pumping stations are approximately 140 feet by 85 feet. The New Natomas cofferdam consisted of 75-foot long sheet piles supported by two levels of tiebacks. The South River cofferdam used deep soil mix walls supported by two levels of tiebacks. Although the 56-foot deep New Natomas cofferdam was originally designed for the installation of an 8-foot tremie concrete mat plus tiedowns, a value-engineering proposal was accepted by the Owner and the cofferdam was dewatered in order to delete the tremie and tiedowns. The 43-foot deep South River Cofferdam was designed for full water head. Also designed other miscellaneous shoring for the construction of appurtenant junction structures and the installation of pipes. Shoring and underground work were essentially completed in 2006.

Fries Avenue Force Main, Port of Los Angeles, California

Following the failure of a frozen earth shaft on Christmas Eve of 1998, was retained to determine causes of failure and effect repairs. The failed frozen shaft was one of two 85-foot deep shafts that were sunk in order to drive a 44-inch diameter casing by microtunnel under a portion of the Port of Los Angeles. Analyzed the failure and re-designed a remedial shoring system using top-down reinforced shotcrete for structural support in frozen ground. Also designed the exit and entrance details for the microtunneling machine.

199 Fremont Building Foundation Construction, San Francisco, California

In charge of the design of temporary shoring using crosslot bracing to support the 180-foot by 140-foot by 45-foot deep excavation for the basement of the building in downtown San Francisco. Also designed the pile-supported trestle that was used to support a Manitowoc 4000 crane used for installing and removing bracing, and redesigned slab rebar for the pile penetrations.

Avalon Canyon Slope Repair, Daly City, California

Avalon Canyon was severely damaged during the 1997-1998 winter rains when severe erosion from a broken storm drain outlet pipe caused major slope failures that threatened numerous homes. In charge of the fast-track design of this multifaceted repair project. The repair design included massive regrading (400,000 cubic yards of fill) to stabilize the existing canyon slopes, a new high-density polyethylene (HDPE) storm drain outlet pipe with appurtenances, surface and subsurface canyon drainage systems consisting of geotextile and shotcrete lined ditches and corrugated aluminum pipe, erosion control and revegetation, and cured-in-place pipe rehabilitation of existing reinforced concrete pipes. The bid-ready contract package was prepared in less than 3 months. Also supervised complete construction management and inspection during construction.

MISCELLANEOUS TUNNEL AND PIPE PROJECTS

Designed a reinforced concrete tunnel portal for PG&E's Grizzly Powerhouse project. Designer for the retrofit of the Fort Baker-Barry highway tunnel that is located near the Golden Gate Bridge. Designed a pipe repair system for a reinforced concrete sewer force main in the City of San Francisco that was damaged in the 1989 Loma Prieta earthquake; designed the two-piece steel pipe replacement with procedure and appurtenances. Performed a peer review and made recommendations to Kiewit Construction Company for a difficult cross-passage between EPB-driven subway tunnels in Washington, D.C. Performed structural and hydraulic computations for the Ragsdale Tunnel, in which a collapsed irrigation tunnel was retrofitted by sliplining the tunnel with a high-density polyethylene pipe. Performed specialty structural analysis and design on the Helms pumped storage project. Designed a scheme for lowering the invert of the existing East Underpass Tunnel while maintaining traffic at San Francisco Airport. In charge of the structural and geotechnical portions of the design of two irrigation tunnels that were installed by pipe jacking near Marysville, California. Performed an analysis of the design of the reinforced concrete penstock for a low-head hydroelectric plant in California.

MISCELLANEOUS SHAFT PROJECTS

Analyzed the headframe and wire rope system that was used for lowering heavy steel liners in a shaft at the Balsam Meadow Hydro Project in California. Designed four caissons for the BART Shop Expansion project in Concord, California. Was in charge of the design of the modifications for the Cosgrove Tunnel Shaft 'B' in Boston, Massachusetts to allow for an increased operating hydraulic head in the tunnel, including shaft extension, installation of a steel pipe lining, and grouting. Provided computations for a compressed air bulkhead used for drilling below the water table in a sunken caisson shaft near Santa Rosa, CA. Discovered that a shaft on a NATM tunnel project in Washington, D.C. was under-designed; this discovery led to the redesign of two shafts on the project.

OTHER PROJECTS

Performed all contractor design, including the design of special hanging platforms used for retrofitting the Stony Gorge Dam in California. Following the Northridge Earthquake in 1991, designed shoring on an emergency basis to secure damaged bridges. Designed a work platform that was used to support equipment and personnel used during the driving of a tunnel into the downstream face of Folsom Dam. Analyzed causes of cracking during the Golden Gate Bridge precast concrete deck replacement. Developed and designed a scheme for lifting bridge girders for bearing replacement with full traffic loading on 170-foot maximum spans in Sacramento, California. Designed a tower crane foundation for construction of a skyscraper in downtown San Francisco. Designed large, elevated steel tanks in Wyoming for a uranium plant. Designed a removable steel cofferdam that was used to gain access to underwater gates of a concrete canal in Jubail, Saudi Arabia. Designed the work trestle for shoring installation, excavation, and shoring removal at the 300 Mission Street excavation project in San Francisco.

DEMOLITION PROJECTS

Performed engineering on approximately 50 demolition projects. Provided demolition engineering at the Grace Cathedral Annex, Embarcadero I in San Francisco, large buildings in Seattle and Oakland, power stacks at Moss Landing, and numerous other structures, including the retrofit of the south approach of the Golden Gate Bridge. Provided engineering for the removal of large water tanks in the East Bay of San Francisco and for the toppling of two steel water towers in Stockton.

Demolition of the steel and concrete cone roof of the Unit 1 enclosure structure at San Onofre Nuclear Facility entailed 3D finite element analysis of the various stages of demolition to assume overall stability of the structure and acceptable

stresses on elements; also included was the design of equipment barriers, energy dissipaters, and tethering of construction equipment working on the roof. Also provided monitoring procedures during demolition of the roof and consulted with SONGS (owner of San Onofre Nuclear Facility) on removal of the cylindrical walls of the structure following roof removal.

PROJECT AND FIELD ENGINEER, SURVEY PARTY CHIEF FOR HEAVY CONSTRUCTION CONTRACTORS

Design, management, and field supervision for two heavy construction contractors building underground and surface subways in Washington, D.C. Underground projects included deep land and marine sheet pile cofferdams with tremie slabs, sunken tubes, railroad underpinning, tunneling beneath railroad lines, ground freezing, and underwater pile driving. Above-ground work involved ballasted railroad, shoring railroad tracks with shoofly embankments, highway bridge construction, and restoration. Design work included various types of temporary shoring, cofferdams, reinforced concrete, temporary water bulkheads, piles, and heavy crane lifts from barges (including rigging). Supervised post-tensioning of concrete roof and thin-shelled canopy.

PUBLICATIONS & ARTICLES

- "Pile Test for Earthquake Repair", Civil Engineering Magazine, D. Berti December 1991.
- "San Francisco CSO", D. Berti with W. Edgerton and M. Wong, Civil Engineering Magazine, May 1995.
- "Shoring for Rankin Pump Station", D. Berti with J. Singh and J. Chia, Geotechnical News; September 1995.
- "Buckling of Steel Tunnel Liner under External Pressure", D. Berti with R. Stutzman, E. Lindquist and M. Eshghipour, ASCE Journal of Energy Engineering; December 1998.
- "Cementing the Future", D. Berti with D. Koutsoftas and E. Lindquist, Civil Engineering Magazine, December 1998.
- "Under Pressure", D. Berti with M. Eshghipour and J. Shamma, Civil Engineering Magazine, July 1999.
- "Deep Freeze", D. Berti with E. Lindquist, L Roesner, Civil Engineering Magazine, February 2002.