



MODULATION OF STANDARD CONFIGURATION

- Pile capacities change with strand quantity, diameter, location and concrete strength. A wide variety of pile designs are used throughout North America, even within one pile size.
- The KIE-LOCK splice load bearing elements **are designed to meet strength requirements** (see "Specs") using the standard configuration and modifying main plate thickness, size of locking bars, and size, number and length of rebar anchor/pile end reinforcement.

CALCULATIONS

- Calculations verifying the mechanical ability of the load-bearing components to meet specified capacities **in tension, bending, and compression** are submitted, with detailed shop drawings.
- Rebar anchor/pile end reinforcement is designed to ACI/AASHTO, DOT, and/or building code requirements, and calculations are included. The KIE-LOCK uses only Dayton/Richmond threaded Dowel Bars which give 100% strength of each rebar size, instead of cut threading rebar ends which reduces the effective tensile area by one rebar size.

TEST REPORTS

- There are no standard precast pile designs used throughout North America. Pile designs tend to be regional and vary with the customer. Therefore, it is not practical or economically feasible to have tests for every pile design, project, or have blanket certifications (such as ICBO) that are meaningful.
- **KIE-LOCK test reports** are representative and verify the design methodology:
 - 1) University of Illinois (Gamble) 14" sq. splices.
 - 2) Ecole Polytechnique (Houde & Roux) 14" sq. & 16" oct. splices.
 - 3) Gerwick Eng. (Ben Gerwick) 12" sq. splices.
 - 4) Hawaiian Dredge & Const. (Naaru Tower) 16" oct. splices.
 - 5) Haley & Aldrich (US Courthouse, Boston) 14" sq.
 - 6) Florida DOT Laboratory Tests of 24" sq. splices.See "Contacts" for Test Report requests.

ENGINEERING & DESIGN - KIE-LOCK PILE SPLICES

CORROSION

- Studies by the National Bureau of Standards (Materials Research, Metallurgy Div.) conclude that steel pilings are not significantly affected by corrosion in undisturbed (anaerobic) soils, regardless of soil types and properties. A copy of this report is available.
- CalTrans reports of extraction of earthquake collapsed Cypress Viaduct steel pipe piles in Oakland indicate that no significant corrosion occurred in 35+ years despite presence of high levels of chloride, sulfates, and low values of soil resistivities. A copy of this report is available.
- A steel splice can be safely located in the concrete pile zone that is in previously undisturbed (anaerobic) soil, and below ocean and river scour lines. (See "Projects" for some pier and bridge installations.)

INNOVATIVE USES

- The KIE-LOCK has been used to connect different pile sizes (20" sq. tops to 16" oct. bottoms -- Keehi Interchange, Honolulu; and 16" sq. tops to 14" sq. bottoms -- Mission Bay, San Francisco -- see "Photos" section) for higher pile moment at the top of the pile. This approach is an opportunity for pile designers working with seismic considerations to save client money, since pile design moment load is maximum in the top 10-30 ft. and it is unnecessary to keep the same moment capacity below that.
- The KIE-LOCK is a relatively ductile connection for seismic area 3 and 4 considerations. Kobe results indicate that concrete piles spliced with steel did not fail before non-spliced piles did..
- The KIE-LOCK has been used to make up thousands of 16" oct. 3 segment, 270 ft. long piles; 7 segment, 180 ft. long piles (Keehi Interchange 1981-5); and 8 segment, 64 ft. long piles (San Francisco Airport Expansion, 1997). No project has had a splice failure.
- KIE-LOCK splices can connect composite piles, composite to concrete, and pipe to concrete (a yet undiscovered combination by designers that would save clients' cost). **Think of a problem and my team will work with you to solve it safely and cost-effectively.**

PILE SPLICES, INC

264 Cazneau Ave., Sausalito, CA 94965
Phone: 415-331-7260 Fax: 415-331-7261