CITY OF LOS ANGELES HARBOR DEPARTMENT
Port of Los Angeles

REVOCABLE PERMIT
No. 21-20

The Executive Director of the Harbor Department ("Executive Director") of the City of Los Angeles ("City") hereby grants permission to AMERICAN MARINE CORPORATION ("Tenant") to occupy and use certain lands and/or waters and/or facilities within the Harbor District owned or under the control of City, acting through its Board of Harbor Commissioners ("Board"), subject to the following terms and conditions:

1. Premises. Tenant is permitted under this Revocable Permit ("Permit") to use the lands and/or waters and/or facilities located at 1500 South Barracuda Street, Terminal Island, CA 90731, designated as Parcel No. 1 – 49,105 square feet of wharf/paved land; Parcel No. 2 – 61,725 square feet of water area; Parcel No. 3 – 1,306 square feet of paved land; and Parcel No. 4 – 15,913 square feet of paved fire lane delineated and more particularly described on Exhibit A ("Premises"). The Harbor Department reserves the right to delete Parcel No. 3 with 180 days' written notice should there be a closure of Marina Street or if Barracuda Street is realigned to allow movement of traffic in adjacency to the former Ardagh Metal Packaging warehouses. By mutual agreement of Executive Director and Tenant, land and water not exceeding ten percent (10%) of the Premises granted, or 20,000 square feet, whichever is greater, may be permanently added to or deleted from the Premises granted herein without further approval of Board subject to the following conditions: (1) so long as such change in the Premises is not temporary within the meaning of the Port of Los Angeles Tariff No. 4, as it may be amended or superseded ("Tariff"), Item No. 1035 (or its successor), the compensation set forth in Section 4 of this Permit shall be increased or decreased pro rata to reflect any such addition or deletion; (2) if the change involves the addition or deletion of any improvement, the adjustment to the compensation shall also take into account this change in the same manner in which the compensation was originally calculated; (3) if permanent changes in the area of the Premises are made on more than one occasion, the cumulative net change in area may not exceed ten percent (10%) or 20,000 square feet, whichever is greater, of the originally designated Premises, and (4) the change in area of the Premises shall not result in the annual compensation exceeding One Hundred Fifty Thousand Dollars ($150,000). Executive Director is authorized to execute amendment(s) to this Permit to effect the foregoing adjustments to area of the Premises and compensation without further action of Board.

2. Permitted Use. The Premises shall be used for operation of a tugboats, barge services and use of a portable crane for the purpose of transport of marine equipment and supplies and other uses incidental thereto ("Permitted Use") and not for any other use without the prior written consent of Executive Director which approval may be withheld by City in its sole and absolute discretion. Use of portable crane may only occur after the submission and approval of a Heavy Lift Permit issued by the Harbor Department Engineer. The Heavy Lift Permit must be renewed annually. Tenant shall not use the Premises in any manner, even if the use is a Permitted Use that will cause cancellation of any insurance policy covering the Premises or adjacent premises; provided, however, Tenant may, in City's sole discretion, remain if it pays the increase in City's insurance costs caused by its operations. No offensive or refuse matter, or any substance constituting any unnecessary, unreasonable, or unlawful fire hazard, or material detrimental to the public health, shall ever be permitted by Tenant to be or remain on the Premises, and Tenant shall prevent any such material or matter from being or accumulating upon the Premises. Tenant further agrees not to keep on the Premises or permit to be kept, used, or sold thereon, anything prohibited by any policy of fire insurance covering the Premises or any structure erected thereon.

3. Effective and Termination Dates. This Permit shall be effective on the date it is executed by Executive Director ("Effective Date") and shall thereafter be revocable at any time by Tenant or by Executive Director upon the giving of at least thirty (30) days' written notice to the other party stating the date upon which this Permit shall terminate ("Termination Date"); provided, however, if (1) this Permit is not terminated prior to the fifth (5^{th}) anniversary of the Effective Date, then before such time Board shall review this Permit regarding its continuation and/or modification, or (2) Section 7, below, is invoked, Executive Director may terminate this Permit immediately with no prior notice. Termination Date shall also mean the date that the Permit terminates in connection with Tenant's Default under Section 13, Tenant's misrepresentation under Section 23, a court decision under Section 24, or a conflict of interest under

Section 25 of this Permit, or any termination by operation of law or any other reason. The right of Executive Director to revoke this Permit is and shall remain unconditional. Neither City, nor any board, officer, or employee thereof, shall be liable in any manner to Tenant because of such revocation. Tenant shall commence using the Premises for the Permitted Use within thirty (30) days from the Effective Date.

4. Compensation.

(a) Monthly Rent. On or before the first day of each month, in advance, Tenant shall pay to City Rent pursuant the rent schedule below ("Rent") for the use of the Premises. Use of the Premises for purposes not expressly permitted herein, whether approved in writing by Executive Director or not, may result in additional charges, including charges required under the Tariff. Tenant agrees to pay such additional charges. Executive Director may change the amount of Rent required herein upon giving at least thirty (30) days' written notice to Tenant. Rent paid by Tenant shall be applied to the oldest outstanding balance. Rent is in addition to any applicable charges under the Tariff.

American Marine Rent Schedule

			YEAR 2022-2023		YEAR 2023-24		YEAR 2024-2025		YEAR 2025-2026		YEAR 2026-2027	
			STEP INCREASE 12 MONTHS		STEP INCREASE 12 MONTHS		STEP INCREASE 12 MONTHS		+CPI 12 MONTHS		+CPI 12 MONTHS	
PARCEL	TYPE	SIZE IN SF	RENTAL RATE	TOTAL RENT	RENTAL RATE	TOTAL RENT	RENTAL RATE	TOTAL RENT	RENTAL RATE	TOTAL RENT	RENTAL RATE	TOTAL RENT
1	PAVED LAND/WHARF	49,105	$0.16	$96,049.38	$0.19	$111,959.40	$0.21	$123,744.60	$0.22	$127,456.94	$0.2228	$131,287.13
2	WATER	61,725	$0.054	$39,997.80	$0.063	$46,664.10	$0.070	$51,849.00	$0.07	$53,404.47	$0.0743	$55,034.01
3	PAVED LAND	1,306	$0.16	$2,554.54	$0.19	$2,977.68	$0.21	$3,291.12	$0.22	$3,389.85	$0.2228	$3,491.72
4	FIRE LANE	15,913	$0.087	$16,613.17	$0.096	$18,331.78	$0.105	$20,050.38	$0.108	$20,661.44	$0.1114	$21,272.50
	Total Area	128,049	**TOTAL:**	**$155,214.89**	**TOTAL:**	**$179,932.96**	**TOTAL:**	**$198,935.10**	**TOTAL:**	**$204,912.70**	**TOTAL:**	**$211,085.36**
			Monthly:	$12,934.57		$14,994.41		$16,577.93		$17,076.06		$17,590.45
			% Increase	2.12%		15.93%		10.56%		3.00%		3.0%

ANNUAL CPI ASSUMPTION:	3.0%

(CPI SUBJECT TO ACTUAL ECONOMIC CONDITIONS)

PREVIOUS MO. RENT UNDER RP 96-13:	$12,666.36
69,794 sf Land/wharf**	
60,715 sf Water	

(b) Rent Adjustments. Provided this Permit is not sooner terminated, effective July 1st of the year following the Effective Date (which date and subsequent anniversaries shall be referred to individually as the "Adjustment Date") of the tenancy, and annually thereafter, the Rent will be adjusted as of July 1 in year 4 of this Permit automatically without further notice to reflect the greater of 3% or percentage increase (but not any decrease), if any, in the Consumer Price Index, all Urban Consumers of the Los Angeles-Long Beach Anaheim County, California area, 1982-84=100, as published by the U.S. Department of Labor, Bureau of Labor Statistics ("CPI"), or successor index selected by Executive Director in his or her sole reasonable discretion. Such adjusted amount of Rent shall be equal to the product obtained by multiplying the Rent amount in effect on the Adjustment Date by a fraction, the numerator of which is the July CPI index on the Adjustment Date and the denominator of which for the first adjustment is the July CPI Index for the calendar year in which the Effective Date occurs, and for all subsequent adjustments through the tenancy is the July CPI index of the prior Adjustment Date.

The formula illustrating the adjustment computation is as follows:

$$\text{Adjusted Rent} = \text{Rent as of Adjustment Date} \times \frac{\text{July CPI Index of Adjustment Date}}{\text{July CPI Index of Effective Date or Prior Adjustment Date}}$$

In addition to or in lieu of the above, City may, at any time, change the amount of Rent without reference to CPI adjustment by giving Tenant thirty (30) days' notice of such change as provided in Section 4(a) of this Permit.

(c) Late Charge. Rent payments which have not been paid within ten (10) days of the due date shall be subject to a service charge consisting of simple interest of one-thirtieth (1/30) of two percent (2%) of the invoice amount remaining unpaid each day, for costs and expenses incurred by reason of Tenant's late payment. City shall have the right, without further notice to Tenant, to change the amount charged for the late charge to the amount set forth in Tariff Item No. 270 if the amount in Tariff Item No. 270 changes. Acceptance of any late charge (or any other payments) shall not constitute a waiver of Tenant's default under Section 13 of this Permit.

(d) Security Deposit. Prior to the issuance of this Permit, Tenant shall deposit with City a sum equal to two months' rent as security for Tenant's performance under this Permit ("Security Deposit") including but not limited to covering Tenant's delinquent Rent and its other obligations under this Permit including but not limited to repairing damages to the Premises. Notwithstanding the foregoing, City shall not be required to apply the Security Deposit to any of Tenant's obligations under this Permit during the term of the Permit. If the Rent is thereafter increased, Tenant shall increase the Security Deposit as necessary to assure that Tenant at all times has on deposit a sum equal to two months of the current Rent. If all or any part of the Security Deposit is used to pay any Rent due and unpaid or to meet any other Tenant obligation, Tenant shall then immediately reimburse City for the amount applied so that at all times during the life of this Permit the full amount the Security Deposit set forth above shall be on deposit with City. Failure to maintain the full amount of the Security Deposit shall constitute a material breach of this Permit. In the sole discretion of Executive Director, Tenant may post other forms of security but only in a form acceptable to the Los Angeles City Attorney. If for any reason City has not initially required a Security Deposit from Tenant, City may at any time and for any reason require a Security Deposit in an amount Executive Director determines necessary to secure performance of the Permit. Tenant agrees to post such deposit with City within ten (10) days of written request from City and agrees that its failure to do so constitutes a material breach of this Permit. No interest is payable by City on the Security Deposit. Any deposit required under this Section 4 shall be in addition to any deposit required for the issuance of a Harbor Engineer Permit pursuant to Section 9 of this Permit.

(e) No Right of Set-Off. Notwithstanding any other provision of this Permit, Tenant's obligation to pay all Rent shall be absolute and unconditional and shall not be affected by any circumstance including, without limitation, any set-off, counterclaim, recoupment, defense, or other right or claim which Tenant may have against City.

(f) Place of Payment. Tenant shall render its payments to City of Los Angeles Harbor Department, P.O. Box 102647, Pasadena, CA 91189-2647, or any other place that City from time to time may designate in writing. Payment shall be made in U.S. Dollars, either in the form of a check (drawn on a bank located in the State of California) or via electronically transmitted funds. Rent is to be paid only by Tenant. Notwithstanding the foregoing, acceptance of Rent paid by any entity or person other than Tenant shall not create any rights under this Permit for the entity or person making the Rent payment.

(g) Rent. All amounts payable by Tenant to City under this Permit during the term of this Permit shall be deemed to be Rent.

5. Utility Charges. Unless otherwise provided for herein, Tenant shall pay all charges for services furnished to the Premises or used in connection with its occupancy, including, but not limited to, heat, gas, power, telephone, water, light, and janitorial services, and pay all deposits, connection fees, charges, and meter rentals required by the supplier of any such service, including City.

6. Rights-of-Way. This Permit shall at all times be subject to rights-of-way over, on, under, and through the Premises for (1) sewers; storm drains; pipelines (public or private); telecommunications equipment; conduits; telephone, cable, fiber optic, and/or power lines; and all similar items; (2) streets, highways, railroads, and all other means of transportation; and (3) equipment access, occupancy, and all

other rights reasonably necessary to comply with homeland security or related requirements of federal, state, and local agencies; regardless of whether such rights-of-way exist or are authorized by Board or City in the future. City further reserves rights-of-way over, on, under, and through the Premises as Board or City requires to drill and explore new, or to maintain existing, oil, gas, or mineral wells. This Permit and the Premises shall at all times be subject to all prior exceptions, reservations, grants, easements, leases, or licenses of any kind whatsoever as the same appear of record in the Office of the Recorder of Los Angeles County, California, or in the official records of City or any of its various departments, and shall also be at all times subject to additional reservations Board or City may reasonably require after the Effective Date for which Tenant shall receive no compensation unless otherwise expressly provided.

7. Premises Satisfactory to Tenant / Required Modifications. Tenant acknowledges the condition of the seawall is cost prohibitive to repair and the Harbor Department has previously shown other available properties for Tenant relocation but Tenant has declined all alternative sites and has opted to continue occupancy at the current Premises. See Exhibit B. Tenant acknowledges that degradation at the Premises will continue and is unavoidable and will, at some point in the future, preclude occupancy. When that degradation reaches the point that the Chief Harbor Engineer determines the property is unsafe for occupancy, the Executive Director, at its sole discretion, may terminate the Permit immediately with no prior notice. City will not be responsible for any damage, financial or otherwise, incurred by Tenant in any form, as a result of terminating the Permit, displacement from the site, both in part or whole, or as a result of wharf/sea wall deterioration. The Harbor Department will not be responsible for relocation of Tenant, nor for any loss, including but not limited to, business enterprise value related to operations as a result of the property becoming unsafe for occupancy. With the understanding of the aforementioned conditions, Tenant has inspected the Premises and agrees that they are suitable for the Permitted Use. No officer or employee of City has made any representation or warranty with respect to the Premises, except as described in writing and attached hereto as an addendum, if any, and in entering into this Permit, Tenant agrees it relies only on the provisions of the Permit and its exhibits. Any modification, improvement, or addition to the Premises and any equipment installation or removal required by the Fire Department, Department of Building and Safety, South Coast Air Quality Management District, Regional Water Quality Control Board, U.S. Coast Guard, Environmental Protection Agency, or any other agency in connection with Tenant's operations, shall be constructed, installed, or removed at Tenant's sole expense. Tenant shall obtain a Harbor Engineer Permit from the office of the Chief Harbor Engineer, Engineering Division, of City's Harbor Department ("Chief Harbor Engineer") and shall comply with the requirements of Section 9 of this Permit before making any modification, improvement, or addition to the Premises.

8. Maintenance and Repair.

(a) Maintenance Performed by Tenant. With the exception of the remaining fence section shown in red in Exhibit C, Tenant, at its sole cost and expense, shall keep and maintain the Premises, and all buildings, works, and improvements of any kind thereon, in good and substantial repair and condition and shall be responsible for and perform all necessary inspection, maintenance, and repair thereof, including preventive maintenance, using materials and workmanship of similar quality to the original improvements. Tenant shall obtain any permits, including but not limited to those issued by City, necessary for such maintenance and repair. Tenant will maintain the grade separation wall and perimeter fencing only along the eastern edge of Barracuda Street from Marina Street to the point where the wharf changes to a southwesterly direction. (See Exhibit C.)

i. Sink Hole Repair Procedure. Upon discovery of a sink hole, Tenant will take immediate preventative safety measures to avoid use of the area surrounding the sink hole. Tenant will subsequently notify the Harbor Department Engineer within two (2) days of the discovery of a sink hole requesting the Harbor Department's Engineering Division to perform a technical site review of the failure location. An engineer will be dispatched within two (2) business days of being notified by Tenant of the sink hole repair required. Subsequent to the engineer's on-site inspection and review of the damage, the Engineering Division will issue a description of the prescribed repair specifying method and materials to be used by Tenant to effect repairs. Should the Harbor Engineer determine, at its sole discretion that the sink hole is better repaired by the Harbor Department due to project scope or complexity of repair, it may instruct the Harbor Department's Construction and Maintenance Division to perform the repair in lieu of

Tenant. Any repair costs related to wharf/sink hole repair conducted by the Harbor Department will be considered additional Rent.

ii. Safety of Premises. At Tenant's sole cost and expense, Tenant will provide a Dive Report of the Premises to the Harbor Engineer no later than January 1, 2023 and no later than July 1, 2025 documenting the condition of the premises sea wall, wharf and slope. The Dive Report will be performed to the criteria as described and listed in Exhibit D.

(b) Failure to Maintain. If Tenant fails to make any repairs or to perform required maintenance within thirty (30) days after receipt of notice from City to do so, City may, but shall not be obligated to, make such repairs or perform such maintenance at Tenant's expense. Notwithstanding, in an emergency as determined by City (including but not limited to an immediate threat of physical harm to persons and/or material damage to the Premises and/or structural or foundational damage to any improvements thereon), City shall have the right, but not the obligation, to undertake immediate repairs to the Premises and any structures thereon without notice. Tenant shall reimburse City for City's costs (as defined in Section 8(c) of this Permit) within thirty (30) days after receipt of City's invoice for work performed. If Tenant shall commence such repairs and diligently pursue the same to completion or shall begin to perform the required maintenance within the thirty (30) day period, City shall refrain from commencing or pursuing further any repairs or performing any required maintenance until the work has been completed by Tenant. Tenant shall thereafter pay on demand City's costs incurred pursuant to this Section 8(b) prior to Tenant's commencement of repair or maintenance. The making of any repairs or the performance of maintenance by City, which is the responsibility of Tenant, shall in no event be construed as a waiver of the duty or obligation of Tenant to make future repairs or perform required maintenance as herein provided.

(c) City's Costs. "City's costs" for purposes of this Section 8 shall include, in City's sole reasonable discretion, the cost of maintenance or repair or replacement of property neglected, damaged or destroyed, including direct and allocated costs for labor, materials, services, equipment usage, and other indirect or overhead expenses arising from or related to maintenance, repair, or replacement work performed by or on behalf of City.

(d) Litter and Debris. Tenant, at its sole cost and expense, shall provide sufficient dumpsters or other like containers for trash collection and disposal and keep the Premises free and clear of rubbish, debris, and litter at all times. Tenant shall perform annually, at a minimum, before the commencement of the rainy season, inspections and cleaning of any storm water catch basins (including filters), maintenance holes, and drains, maintaining the submerged land underlying any water berthing area at the Premises free and clear of debris from the wharf and from vessels, and cargo loading and unloading operations of vessels berthed at said berths in connection with Tenant's undertaking of the Permitted Use. Tenant, at its sole cost and expense, further shall keep and maintain the Premises in a safe, clean, and sanitary condition in accordance with all applicable federal, state, municipal, and other laws, ordinances, rules, and regulations.

(e) Fire Protection Systems. All fire protection sprinkler systems, standpipe systems, fire hoses, fire alarm systems, portable fire extinguishers, and other fire-protective or extinguishing systems, with the exception of hydrant systems, or appliances which have been or may be installed on the Premises shall be maintained and repaired by Tenant, at its cost, in an operative condition at all times.

(f) City Inspections. Upon City's request, Tenant shall provide personnel to accompany City's representatives on periodic inspections of the Premises to determine Tenant's compliance with this Permit. Notwithstanding the foregoing, nothing obligates City to make such determinations and City shall not incur any liability for not making such inspections and determinations.

9. Alterations on Premises. Tenant shall not construct on or alter ("Alteration") the Premises, including a change in the grade, without first obtaining City's written approval and a Harbor Engineer Permit. Tenant shall submit to City a complete Application for Port Permit that attaches a complete set of drawings, plans, and specifications reflecting the proposed Alteration. Where applicable, the drawings, plans and specifications must be prepared and stamped by a licensed engineer registered in the State of California. All projects in the Harbor District are subject to review by City's Harbor Department pursuant to the

California Environmental Quality Act (CEQA) and the certified Port Master Plan. City's Chief Harbor Engineer shall have the right to reject or order reasonable changes in said drawings, plans, and specifications. Tenant, at its own expense, shall obtain all permits necessary for such Alteration, including a Harbor Engineer Permit, prior to the commencement of such Alteration. All Alterations by Tenant pursuant to this Permit shall be at Tenant's sole expense. Tenant shall keep the Premises free and clear of liens for labor and materials and shall hold City harmless from any responsibility in respect thereto. Tenant shall give written notice to the Chief Harbor Engineer, in advance, of the date it will commence any Alteration. Immediately upon the completion of the Alteration, Tenant shall notify the Chief Harbor Engineer of the date of such completion and shall, within thirty (30) days after such completion, file with the Chief Harbor Engineer, in a form acceptable to the Chief Harbor Engineer, a set of "as built" plans for such Alteration if required under the terms of the Harbor Engineer Permit issued for the Alteration.

10. Signs and Lighting. Tenant shall not erect or display, or permit to be erected or displayed, on the Premises any signs or advertising matter of any kind without first obtaining the written consent of Executive Director. If Tenant obtains consent, Tenant shall also comply with the requirements of Section 9 of this Permit prior to erecting or displaying any signs or advertising matter on the Premises. Tenant shall further post, erect, and maintain on the Premises such signs as Executive Director may direct. All signs erected or displayed on the Premises shall comply with the regulations set forth in Section 14.4.1 *et seq.* of the Los Angeles Municipal Code. Tenant acknowledges that the Premises may lack adequate lighting for a Permitted Use and that Tenant is responsible for installing temporary or permanent lighting as it may deem necessary to perform any labor, or to protect any property stored or located on the Premises, or to otherwise use the Premises for any Permitted Use. Tenant shall comply with the requirements of Section 9 of this Permit prior to installing any lighting. Any lighting installed shall meet Illuminating Engineering Society / American National Standards Institute (IES/ANSI) standards.

11. Immediate Access to Repair / Maintain Premises. Tenant is aware that City's Department of Water & Power, other utility, or other maintenance or service from or on behalf of City, may need to service or repair certain facilities on the Premises. If such repair is necessary, Tenant agrees to relocate, at its expense, all of its equipment and other personal property to provide such personnel adequate access. Tenant agrees to complete such relocation within twenty-four (24) hours of receiving notice from City except in case of emergency. Tenant agrees neither the department servicing the Premises nor City shall be responsible for any loss Tenant may suffer as a result of such maintenance or repair.

12. Premises Subject to Tariff. Tenant accepts the Premises and shall undertake the Permitted Use set forth in Section 2 of this Permit subject to each and every term and condition provided herein, and to each and every rate, term, and condition of the Tariff, as applicable to Premises and/or the Permitted Use. Tenant represents and warrants that it has received, read, and understands the rates, terms, and conditions of the Tariff. Except as otherwise set forth in this Permit, Tenant is contractually bound by all Tariff rates, terms, and conditions as if the same were set forth in full herein. City in its sole and absolute discretion shall determine if a conflict exists between a provision of this Permit and a Tariff provision. In the event of such conflict, this Permit shall at all times prevail.

13. Tenant Default.

(a) Events of Default. The occurrence of any of the following shall constitute a material breach and default by Tenant under this Permit:(1) Tenant's failure to pay when due any Rent required to be paid under this Permit if the failure continues for three (3) days after written notice from City; (2) Tenant's failure to perform any other obligation under this Permit if Tenant fails to cure the failure within three (3) days after delivery of written notice of the failure from City to Tenant; (3) Tenant's abandonment of the Premises including but not limited to (i) Tenant's absence from or failure to use the Premises or any substantial portion thereof for three (3) consecutive days (excluding Saturdays, Sundays, and California legal holidays) while in default of any provision of this Permit; or (ii) if Tenant is not in default, Tenant's absence from or failure to use the Premises or any substantial portion thereof for a period of thirty (30) consecutive days unless Tenant, prior to the expiration of any such period of thirty (30) consecutive days, notifies Executive Director in writing that such nonuse is temporary and obtains the written consent of Executive Director to such nonuse; (4) To the extent permitted by law (i) a general assignment by Tenant or any guarantor of the

Permit for the benefit of the creditors without written consent of City; (ii) the filing by or against Tenant, or any guarantor, of any proceeding under an insolvency or bankruptcy law, unless (in the case of an involuntary proceeding) the proceeding is dismissed within sixty (60) days; (iii) the appointment of a trustee or receiver to take possession of all or substantially all the assets of Tenant or any guarantor, unless possession is unconditionally restored to Tenant or that guarantor within thirty (30) days and the trusteeship or receivership is dissolved; and/or (iv) any execution or other judicially authorized seizure of all or substantially all the assets of Tenant located on the Premises, or of Tenant's interest in this Permit, unless that seizure is discharged within thirty (30) days.

(b) City's Remedies. City may pursue any and all remedies at law or in equity including seeking all monetary damages and termination of this Permit. City's remedies are cumulative and not inclusive. Nothing herein shall imply that City's right to revoke or terminate this Permit as provided in Section 3 of this Permit is limited in any way. All personal property that remains on the Premises after Tenant vacates the Premises shall become the property of City, at City's option.

14. Compliance with Applicable Laws and Environmental Obligations.

(a) At all times in its use and occupancy of the Premises and its conduct of operations thereon, Tenant, at Tenant's sole cost and expense, shall comply with the Harbor Department's Environmental Permit Conditions, attached as Exhibit E and all applicable federal, state, county, City, or government agency laws, statutes, ordinances, standards, codes (including all building codes), rules, regulations, requirements, or orders in effect now or hereafter in effect ("Applicable Laws") pertaining to the use or condition of the Premises and/or Tenant's operations and conduct of its business. Applicable Laws shall include, but not be limited to, all environmental laws and regulations in effect now or hereafter in effect including:

(i) The Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA") (42 USCS §§ 9601 *et seq.*) in its present or successor form and its implementing regulations;

(ii) The Resource Conservation and Recovery Act and Hazardous and Solid Waste Amendments of 1984 ("RCRA") (42 USCS §§ 6901 *et seq.*) in its present or successor form and its implementing regulations;

(iii) The federal Clean Water Act (33 USCS §§ 1251 *et seq.*) in its present or successor form and its implementing regulations;

(iv) The California Porter-Cologne Water Quality Control Act (California Water Code §§ 13020 *et seq.*) in its present or successor form and its implementing regulations;

(v) The federal Clean Air Act (42 USCS §§ 7401 *et seq.*) in its present or successor form and its implementing regulations;

(vi) The California Clean Air Act of 1988 (Chapter 1568, Statutes of 1988) in its present or successor form and its implementing regulations;

(vii) The California Lewis-Presley Air Quality Management Act of 1976 (California Health and Safety Code §§ 40400 *et. seq.*) in its present or successor form and its implementing regulations; and

(viii) Any other applicable federal, state, or local law, regulation, ordinance or requirement (including consent decrees and administrative orders imposing liability or standard of conduct) now or hereinafter in effect which concerns Environmentally Regulated Material (as defined in Section 14(c)), the Premises, and/or Tenant's use and/or occupancy thereof.

(b) It is the parties' intent that Tenant will make, at Tenant's sole cost and expense, any and all alterations, improvements, and changes, whether structural or nonstructural, that are required by Applicable Laws. In addition, Tenant shall comply immediately with all applicable environmental policies, rules, and directives of City's Harbor Department, known as the Port Environmental Policies. This Permit shall be construed in accordance with California law.

(c) Tenant shall not cause or permit any Environmentally Regulated Material, as defined in this Section 14(c), to be generated, brought onto, handled, used, stored, transported from, received, or disposed of (hereinafter sometimes collectively referred to as "handle" or "handled") in or about the Premises except for limited quantities of standard office and janitorial supplies containing chemicals categorized as Environmentally Regulated Material and except as permitted, required, or necessary under Section 2 of this Permit, if any. Tenant shall handle all such Environmentally Regulated Material in strict compliance with Applicable Laws in effect during Tenant's occupancy. The term "Environmentally Regulated Material" shall mean:

(i) Any "hazardous substance" as that term is defined in the CERCLA;

(ii) "Hazardous waste" as that term is defined in the RCRA;

(iii) Any pollutant, contaminant, or hazardous, dangerous, or toxic chemical, material, or substance, within the meaning of any other applicable federal, state, or local law, regulation, ordinance, or requirement (including consent decrees and administrative orders imposing liability or standard of conduct concerning any hazardous, dangerous, or toxic waste, substance, or material, now or hereinafter in effect);

(iv) Radioactive material, including any source, special nuclear, or byproduct material as defined in the Atomic Energy Act of 1954 (42 USCS §§ 2011 *et seq.*) in its present or successor form;

(v) Asbestos in any form or condition;

(vi) Polychlorinated biphenyls ("PCBs") and any substance or compound containing PCBs; and

(vii) Petroleum products.

(d) Tenant shall remediate or cause the remediation of any spill, discharge, or release of any Environmentally Regulated Material that occurs in, on, under, or about the Premises ("Contamination"), whether caused by Tenant or any third-party during Tenant's occupancy, including Contamination of improvements, adjacent harbor waters, soil, sediment, groundwater, or air, or of adjacent premises (including soil, sediment, groundwater, or air) and including Contamination that is considered a nuisance under Applicable Laws. Remediation shall be to the satisfaction of City, and the requirements of the applicable governmental agencies including the Regional Water Quality Control Board, by removing or effecting the removal of all Contamination including but not limited to contaminated soil, water, groundwater, sediment, or other material it may place or cause to be placed on site such that no encumbrances, such as deed or land use restrictions, be imposed on the Premises as a result of such Contamination. In fulfilling the obligations under this Section 14, Tenant shall also comply with any other conditions reasonably imposed by City. If Tenant knows or has reasonable cause to believe that Contamination has occurred in, on, under, or about the Premises, Tenant shall immediately give written notice to City.

(e) Tenant bears sole responsibility for full compliance with any and all Applicable Laws regarding the use, storage, handling, distribution, processing, and/or disposal of Environmentally Regulated Material including Contamination, regardless of whether the obligation for such compliance or responsibility is placed on the owner of the Premises, on the owner of any improvements on the Premises, on the user of the Premises, or on the user of any improvements on the Premises. For purposes of CERCLA, and any and all other Applicable Laws, Tenant shall be considered the owner and operator. Tenant agrees that any claims, damages, fines, or other penalties asserted against or levied on City and/or Tenant as a result of

noncompliance with any Applicable Laws shall be the sole responsibility of Tenant and that Tenant shall indemnify and hold City harmless from any and all such claims, damages, fines, penalties, and/or judgments, as well as any costs expended to defend against such claims, damages, fines, and penalties and/or judgments, including attorneys' and experts' fees. City, at its sole option, may pay such claims, damages, fines, penalties, and/or judgments resulting from Tenant's noncompliance with any of the aforementioned authorities, and Tenant shall indemnify and reimburse City for any such payments.

(f) In discharging Tenant's obligations under this Permit, if Tenant disposes of any Contamination, within thirty (30) days of Tenant's receipt of original documents, Tenant shall provide City copies of all records, including a copy of each uniform hazardous waste manifest indicating the quantity and type of material being disposed of, the method of transportation of the material to the disposal site, and the location of the disposal site. Neither City, Port of Los Angeles, nor Los Angeles Harbor Department shall appear on any manifest document as a generator of such material.

(g) In discharging Tenant's obligations under this Permit, Tenant shall perform any tests using a State of California Department of Health Services certified testing laboratory or other similar laboratory upon City's written approval. By signing this Permit, Tenant hereby irrevocably directs any such laboratory to provide City, upon written request from City, copies of all of its reports, tests results, and data gathered. As used in this Section 14, "Tenant" includes agents, employees, contractors, subcontractors, and/or invitees of Tenant.

(h) Tenant shall implement City's Harbor Department's policies, known as Best Management Practices, in order to reduce the potential for pollutants to enter Harbor waters, as follows:

(i) Facility Operations: Clean and maintain facility regularly. Use dry cleaning methods whenever possible; avoid washing areas down. Do not allow sweepings or sediment to enter the storm drain or the Harbor. Collect wash water for disposal or direct to a clarifier. Do not encourage scavengers. Do not feed birds, feral cats, sea lions, or other scavengers. Recycle whenever possible.

(ii) Maintenance Operations: Use drip pans to prevent any drips or leaks from contacting the ground during maintenance and fueling operations. Clean spills or drips immediately using dry methods. Use spill cleanup kits to confine or contain spills. Do not hose down equipment or allow process water to enter the storm drain or the Harbor. Place tarps beneath maintenance and repair operations to prevent materials such as paint chips and metals from contacting the ground.

(iii) Material and Waste Handling and Storage: Train employees responsible for waste management on handling and disposal procedures. Store all hazardous and universal waste in accordance with all federal, state, and local regulations. Store all materials and waste inside and in secondary containment. If stored outside, store only in designated, covered, and contained areas. Store waste in covered, leak proof, labeled containers. Keep lids closed on all outdoor containers including dumpsters. Store all oily products (e.g. engines), batteries, tires, and metal off the ground and under cover when stored outdoors.

(i) Except as may be otherwise provided in this Permit, Tenant's obligations in this Section 14 shall survive the Termination Date of this Permit.

15. Restoration and Surrender of Premises.

(a) Tenant's Restoration Obligations. Subject to Section 15(d) of this Permit, on or before the Termination Date of this Permit, unless otherwise excused in writing by Executive Director, Tenant shall quit and return possession of the Premises to City leaving no Tenant improvements, unless City notifies Tenant otherwise in writing, (but leaving City's improvements, if any) and leaving the Premises in at least as good and usable a condition, acceptable to Executive Director, as the same were in at the time of the first occupation thereof by Tenant, or any transferor to and/or assignor of Tenant (collectively, "Assignor") under this Permit and all other previous permits. The term Assignor shall include any and all entities that occupied the Premises prior to Tenant and actually or purportedly transferred and/or

assigned its right of occupancy to Tenant either contractually or under operation of law, including any "Transfer" as defined in Section 19 of this Permit, whether or not there was a written assignment and/or approval of the assignment by City. Tenant shall not damage paving installed by City or any unpaved areas regardless of the nature of Tenant's operations on the Premises. If the condition of the Premises is upgraded during the term of this Permit, Tenant shall restore the Premises to the upgraded condition. If City terminates this Permit pursuant to Section 13 of this Permit, Tenant shall still be obligated to restore the Premises as provided in this Section 15 or to pay the cost of restoration if City chooses to perform the work, at City's option, and Tenant shall be required to pay compensation to City as provided in Section 16 of this Permit. In connection with the foregoing, Tenant, at its sole cost and expense, shall restore the Premises (including the soil, groundwater, and sediment) such that the Premises will be returned to City: (a) free of Contamination and in at least as good of a condition as the condition prior to the installation of all above-ground and below-ground works, structures, improvements, and pipelines of any kind, (collectively referred to as "Structures") in, on, or below the Premises under this Permit and all previous permits (as between City and Tenant, Tenant shall bear sole responsibility for Contamination and any costs related thereto); (b) free of any encumbrances including but not limited to deed or land use restrictions as a result of any Contamination and/or any liens (UCC, federal or state tax, or otherwise) on the Premises or on fixtures or equipment, or personal property left on the Premises; (c) free of Structures placed on the Premises by Tenant (If the Premises, at the time of the Effective Date, have been improved by a prior tenant or by both City and a prior tenant, then such Structures which are left on the Premises at Tenant's request or for Tenant's benefit shall also be the responsibility of Tenant except as may be otherwise specified by this Permit); (d) free of all structures not owned by the Harbor Department, including all buildings formerly placed on the property by The Los Angeles Yacht Club or its successors; and (e) in a clean, level, graded, and compacted condition with no excavations or holes resulting from Structures removed.

(b) Restoration Indemnity. In addition to, and not as a substitute for any remedies provided by this Permit or at law or equity, Tenant shall defend, indemnify, and hold harmless City from any and all claims and/or causes of action, damages, liabilities, judgments, expenses, penalties, loss of rents, and attorneys' and consultants' fees arising out of or involving: (a) Liens on the Premises, Structures, and/or on fixtures and/or equipment or property left on the Premises following the Termination Date; (b) Orders or enforcement actions pending against or in connection with the Premises, the Permitted Use, and/or this Permit; (c) The cleanup of any Contamination including, but not be limited to, the cost of investigation, removal, remediation, restoration and/or abatement. The obligations under this Section 15 shall survive the Termination Date of this Permit.

(c) Relocation Assistance. Nothing contained in this Permit shall create any right in Tenant or any sublessees of Tenant for relocation assistance or payment from City upon termination of this Permit (whether by revocation (Section 3) or default (Section 13) or any other reason. Tenant acknowledges and agrees that it shall not be entitled to any relocation assistance or payment pursuant to the provisions of any state or federal law, including Title 1, Division 7, Chapter 16 of the California Government Code (§§ 7260 *et seq.*) with respect to any relocation of its business or activities upon the termination of this Permit whether by City, by Tenant, pursuant to Section 13 of this Permit, or by operation of law.

(d) Demolition of Improvements / Acceptance of Improvements. If Tenant's improvements are not removed on or before the Termination Date, City shall have the right to remove and/or demolish the same at Tenant's cost. In that event, Tenant agrees to pay to City, upon demand, City's costs of any such removal or demolition. Notwithstanding the foregoing, City reserves the right, at its option, to accept any works, buildings, or other improvements upon the Premises, including a change in the grade thereof, as constructed or altered, in lieu of restoration of the Premises to their condition prior to such construction or alteration.

(e) Site Restoration Plan. Independent of any regulatory agency requirements, upon written request of Executive Director, Tenant shall submit to City a Site Characterization Work Plan for review and approval. Tenant's Site Characterization Work Plan shall include characterization of adjacent Harbor waters, soil, groundwater, and sediment of the Premises. Following City's approval of Tenant's Site Characterization Work Plan, Tenant shall conduct, at its sole cost and expense, a Site Characterization of

the Premises pursuant to the Site Characterization Work Plan approved by City. The Site Characterization of the Premises shall be completed within a period of time specified by Executive Director in his or her sole reasonable discretion and shall be submitted to City for its review. If in City's sole discretion, the results of such Site Characterization indicate that Contamination has been identified or reasonably suspected in, on, under, or about the Premises, Tenant shall provide City, at Tenant's sole cost and expense, a remediation action plan or soil management plan or other work plan ("Remedial Action Plan") as required by City in a form acceptable to City. Tenant shall demonstrate to City's satisfaction that Contamination does not exist or that if Contamination exists, Tenant shall handle, store, treat, remove and properly dispose of the Contamination as described in Section 14 of this Permit pursuant to the Remedial Action Plan and to the satisfaction of City, and the requirements of the applicable governmental agencies including the Regional Water Quality Control Board.

16. Rent During Restoration. Tenant understands and agrees it is responsible for complete restoration of the Premises before the Termination Date, as provided in this Permit and under Applicable Laws, including but not limited to the clean-up of any Contamination in, on or about the Premises. If, for any reason, such restoration is not completed before the Termination Date, then Tenant is obligated to pay City compensation during such restoration period, in an amount equal to the then fair market rental value of the Premises and City's Harbor Department's then established rate of return as determined by City; however, said compensation amount shall not be less than the Rent paid by Tenant at the time of the Termination Date. Tenant also agrees to provide City a surety bond, in an amount determined by Executive Director, in his or her sole reasonable discretion, to assure removal of Contamination from the Premises at any time City demands such bond.

17. Indemnity.

(a) Except as may arise from the sole negligence or willful misconduct of City, Tenant shall at all times relieve, indemnify, protect, and save harmless City and any and all of its boards, officers, agents, and employees from any and all claims and demands, actions, proceedings, losses, liens, costs, and judgments of any kind and nature whatsoever, including cost of litigation (including all actual litigation costs incurred by City, including but not limited to costs of experts and consultants), for death of or injury to persons, or damage to property, including property owned by or under the care and custody of City, and for civil fines and penalties that may arise from or be caused directly or indirectly by:

(i) Any dangerous, hazardous, unsafe, or defective condition of, in, or on the Premises, of any nature whatsoever, which may exist by reason of any act, omission, neglect, or any use or occupation of the Premises by Tenant, its officers, agents, employees, sublessees, licensees, or invitees;

(ii) Any operation conducted upon, or any use or occupation of, the Premises by Tenant, its officers, agents, employees, sublessees, licensees, or invitees under or pursuant to the provisions of this Permit or otherwise;

(iii) Any act, error, omission, willful misconduct, or negligence of Tenant, its officers, agents, employees, sublessees, licensees, or invitees, arising from the use, operation, or occupancy of the Premises, regardless of whether any act, omission, or negligence of City, its officers, agents, or employees contributed thereto;

(iv) Any failure of Tenant, its officers, agents, or employees to comply with any of the terms or conditions of this Permit or any Applicable Laws; or

(v) The conditions, operations, uses, occupations, acts, omissions, or negligence referred to in subdivisions (i), (ii), (iii) and (iv) above, existing or conducted upon or arising from the use or occupation by Tenant or its invitees on any other premises within the Harbor District, as defined in the Charter of City.

(b) Tenant also agrees to indemnify City and pay for all damages or loss suffered by City and City's Harbor Department including, but not limited to, damage to or loss of property, to the extent not

insured by City, and loss of City revenue from any source, caused by or arising out of the conditions, operations, uses, occupations, acts, omissions, or negligence referred to in this Section 17. The term "persons" as used in this Section 17 shall include, but not be limited to, officers and employees of Tenant.

(c) Tenant shall also indemnify, defend, and hold City harmless from any and all claims, judgments, damages, penalties, fines, costs, liabilities, or losses (including, without limitation, diminution of the value of the Premises, damages for loss or restriction on use of rentable or useable space or of any amenity of the Premises, damages arising from any adverse impact on marketing of space, and sums paid in settlement of claims, attorneys' fees, consultants' fees, and experts' fees) which arise during or after the term of this Permit as a result of Contamination for which Tenant is otherwise responsible for under the terms of this Permit. This indemnification of City by Tenant includes, without limitation, costs incurred in connection with any investigation of site conditions or any clean up, remedial, removal, or restoration work required by any federal, state, or local governmental agency because of Contamination present in the soil or groundwater on or under the Premises.

(d) The indemnity obligations under this Section 17 shall survive the Termination Date of this Permit and shall apply regardless of the active or passive negligence of City and regardless of whether liability without fault or strict liability is imposed or sought to be imposed on City.

18. Insurance. In addition to, and not as a substitute for, or limitation of, any of the indemnity obligations imposed by Section 17 of this Permit, Tenant shall procure and maintain at its expense and keep in force at all times during the term of this Permit the following insurance:

(a) Commercial general liability or marine general liability insurance, including contractual liability and property damage insurance, written by an insurance company authorized to do business in the State of California, or approved by the California Department of Insurance as a surplus lines insurer eligible to do business in California, rated VII, A- or better in Best's Insurance Guide (or an alternate guide acceptable to City if a Best's Rating is not available) with Tenant's normal limits of liability but not less than One Million Dollars ($1,000,000) for injury or death to one or more persons out of each accident or occurrence and One Million Dollars ($1,000,000) for bodily injury and property damage for each occurrence / Two Million Dollars ($2,000,000) general aggregate. Where Tenant provides or dispenses alcoholic beverages, host liquor liability coverage shall be provided with the same limits of liability as above.

(b) In addition to and concurrently with the aforesaid insurance coverage, Tenant shall procure and maintain, either by an endorsement thereto or by a separate policy, fire legal liability insurance with a minimum limit of Two Hundred Fifty Thousand Dollars ($250,000) covering legal liability of Tenant for damage or destruction to the works, buildings, and improvements owned by City provided that said minimum limits of liability shall be subject to adjustments by Executive Director to conform with the deductible amount of the fire insurance policy maintained by Board, with waiver of subrogation in favor of Tenant so long as permitted by Board's fire insurance policy, upon thirty (30) days' prior written notice thereof to Tenant at any time during the term of this Permit.

(c) Where Tenant utilizes any vehicles, Tenant shall procure and maintain automobile insurance with limits of liability not less than One Million Dollars ($1,000,000) covering injuries or death resulting from each accident or claim arising out of any one claim or accident. This insurance shall cover all owned, non-owned, and/or hired automobiles.

(d) Tenant shall procure and maintain fire and extended coverage insurance covering One Hundred percent (100%) of the replacement value of the works, buildings, and improvements erected or owned by Tenant on the Premises, with such provision in the policies issued to cover the same, or in riders attached thereto, as will provide for all losses to be payable to Board to be held in trust for reconstruction. In the event of loss or damage by fire to any of such works, buildings, or improvements, Tenant shall undertake replacement or reconditioning of such items within ninety (90) days following any such loss. As Tenant undertakes such replacement or reconditioning, such proceeds shall be released by Board to Tenant as payments are required for said purpose. Upon the completion of such replacement or

reconditioning to the satisfaction of Executive Director, any balance thereof remaining shall be paid to said Tenant forthwith.

(e) Where Tenant's operations involve the storage or use of any type of hazardous materials or pollutants, Tenant shall procure and maintain environmental impairment liability insurance which shall include coverage for bodily injury, property damage, including third-party claims for on-site and off-site bodily injury and property damage, clean-up, and defense of suits, with a limit of at least One Million Dollars ($1,000,000) per occurrence, which is to remain in effect at least five (5) years after the Termination Date.

(f) Where Tenant's operations involve work within fifty (50) feet of railroad tracks, Tenant shall procure and maintain railroad protective liability insurance in which Pacific Harbor Line (PHL), acting for itself, is named the insured with Tenant. The minimum limits of railroad protective liability insurance shall be the limits normally carried by Tenant but not less than Two Million Dollars ($2,000,000) combined single limit for property damage and bodily injury including death. If the submitted policies contain aggregate limits, Tenant shall provide evidence of insurance protection for such limits so that the required coverage is not diminished in the event that the aggregate limits become exhausted. Tenant shall also provide comprehensive general liability coverage with additional insured requirements as previously indicated, however, the railroad exclusion shall be deleted.

(g) Where Tenant operates watercraft, Tenant shall procure and maintain protection and indemnity coverage with limits of One Million Dollars ($1,000,000) per occurrence for bodily injury, illness, death, loss of or damage to the property of another including masters and members of the vessel crew, and Jones Act risks or equivalent thereto internationally. City shall be named as an additional insured.

(h) If Tenant maintains higher limits than the minimums required above, City requires and shall be entitled to coverage for the higher limits maintained by Tenant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to City.

(i) Limits for coverage required under Section 18 of this Permit shall provide first dollar coverage except that Executive Director may permit a self-insured retention or self-insurance in those cases where, in his or her sole judgment, such retention or self-insurance is justified by the net worth of Tenant. The self-insured retention or self-insurance shall provide that any other insurance maintained by City's Harbor Department shall be excess of Tenant's insurance and shall not contribute to it. In all cases, regardless of any deductible, retention, or self-insurance, Tenant shall have all the obligations of an "insurer" under the California Insurance Code and said insurance shall be deemed to include a defense of suits provision and a severability of interest clause.

(j) Policies submitted pursuant to Section 18 of this Permit shall, in addition, provide the following coverage either in the original policy or by endorsement substantially as follows:

(i) "Notwithstanding any inconsistent statement in the policy to which this endorsement is attached, or any endorsement or certificate now or hereafter attached hereto, it is agreed that the City of Los Angeles, acting by and through its Harbor Department, the Board of Harbor Commissioners, and their officers, agents, and employees, are additional insureds hereunder, and that coverage is provided for all contractual obligations, operations, uses, occupations, acts, and activities of all the insureds, including any sole negligence of the additional insureds, under Revocable Permit No. 21-20, and under any amendments, modifications, extensions, or renewals of said Permit regardless of whether such contractual obligations, operations, uses, occupations, acts, and activities occur on the Premises or elsewhere."

(ii) "The coverage provided by the policy to which this endorsement is attached is primary coverage and any other insurance carried by the City is excess coverage."

(iii) "In the event of one of the named insureds incurring liability to any other of the named insureds, this policy shall provide protection for each named insured against whom claim is or may be made, including claims by other named insureds, in the same manner as if separate policies had been

issued to each named insured. Nothing contained herein shall operate to increase the insurance company's limit of liability."

(iv) "Notice of occurrences or claims under the policy shall be made to the City's Risk Manager with copies to the Los Angeles City Attorney's Office."

(k) Tenant shall secure the payment of compensation to any employees injured while performing work or labor necessary for and incidental to performance under this Permit in accordance with Section 3700 of the California Labor Code. Tenant shall file with City one of the following:

(i) A certificate of consent to self-insure issued by the Director of Industrial Relations, State of California;

(ii) A certificate of Workers' Compensation insurance issued by an admitted carrier; or

(iii) An exact copy or duplicate thereof of the policy certified by the Director of Industrial Relations or the insurer.

Such documents shall be filed prior to Tenant's occupancy of the Premises. Where Tenant has employees who are covered by the United States Longshore and Harbor Workers' Compensation Act ("USLHWC Act"), Tenant shall furnish proof of such coverage to City. It is suggested that Tenant consult with its insurance professional of its choosing to determine whether its proposed operation methods will render its employees subject to coverage under the USLHWC Act. All Workers' Compensation insurance submitted to City shall include an endorsement providing that any carrier paying benefits agrees to waive any right of subrogation it may have against City.

(l) All insurance procured by Tenant shall comply with the following:

(i) Each insurance policy shall provide that it will not be cancelled or reduced in coverage until after City's Risk Manager has been given a 10-day notice of cancellation for nonpayment of premium, and a 30-day notice of cancellation for any other reason.

(ii) Electronic submission is the required method of submitting Tenant's insurance documents. KwikComply® is City's online insurance compliance system which is designed to be used by insurance brokers and agents to submit client insurance certificates directly to City. Tenant's insurance broker or agent shall obtain access to KwikComply® at http://kwikcomply.org and follow the instructions to register and submit the appropriate proof of insurance on Tenant's behalf.

(iii) Prior to the expiration of each policy, Tenant shall show through submitting to KwikComply® that the policy has been renewed or extended or, if new insurance has been obtained, submit the appropriate proof of insurance to KwikComply®. If Tenant neglects or fails to secure or maintain the required insurance, or if Tenant fails to submit proof of insurance as required above, City's Harbor Department may, at its option and at the expense of Tenant, obtain such insurance for Tenant.

(iv) Executive Director, at his or her discretion, based upon recommendation of the Risk Manager of City's Harbor Department, may request that Tenant increase or decrease amounts and types of insurance coverage required hereunder at any time during the term hereof by giving written notice to Tenant.

(v) Immediately upon procuring any and all policies of insurance required herein, Tenant must request from Tenant's insurance carrier(s) full certified copies of such policies of insurance. Tenant shall thereafter provide such full certified copies of such policies to City within thirty (30) days of Tenant's receipt of such policies from Tenant's insurance carrier(s). Tenant's obligation to provide such copies shall survive the Termination Date regardless of whether Tenant receives such policies prior

to or after the Termination Date. Tenant shall further provide written notice to City of any change of terms of any policies of insurance required herein within thirty (30) days of any such change.

(vi) Tenant shall report in writing to Executive Director within fifteen (15) days after it, its officers, or its managing agents have knowledge of any accident or occurrence involving death of or injury to any person or persons, or damage in excess of Ten Thousand Dollars ($10,000) to property, occurring upon the Premises, or elsewhere within the Harbor District, if Tenant's officers, agents, or employees are involved in such an accident or occurrence. Such report shall contain to the extent available: (1) the name and address of the persons involved; (2) a general statement as to the nature and extent of injury or damage; (3) the date and hour of occurrence; (4) the names and addresses of known witnesses; and (5) such other relevant information as may be known to Tenant, its officers, or its managing agents.

19. No Assignments/Subleases/Transfers. No transfer of this Permit, or any interest therein or any right or privilege thereunder, regardless of whether accomplished by a separate agreement, sale of stock or assets, merger or consolidation or reorganization by or of Tenant (or any entity that directly or indirectly controls or owns fifty percent (50%) or more of Tenant), or accomplished in any other manner, whether voluntary or by operation of law, including but not limited to assignment, sublease, transfer, gift, hypothecation, or grant of total or partial control, or any encumbrance of this Permit (hereafter collectively referred to as "Transfer"), shall be valid or effective for any purpose. “Transfer” also shall include the involvement of Tenant or its assets in any transaction, or series of transactions (by way of merger, sale, acquisition, financing, transfer, leveraged buyout, or otherwise) whether or not a formal assignment or hypothecation of this Permit or Tenant’s assets, which involvement results in a reduction of the net worth of Tenant (defined as the net worth of Tenant, excluding guarantors, established by generally accepted accounting principles) by an amount greater than twenty-five percent (25%) of such net worth as it was represented at the time of the execution of this Permit or as it exists immediately prior to said transaction or transactions constituting such reduction, whichever was or is greater. For purposes of this Section 19, the term "by operation of law" includes but is not limited to: (1) the placement of all or substantially all of Tenant's assets in the hands of a receiver or trustee; or (2) a transfer by Tenant for the benefit of creditors; or (3) transfers resulting from the death or incapacity of any individual who is a Tenant or of a general partner of a Tenant.

20. Tenant Name Change. Tenant shall notify City in writing within ten (10) days of making any changes to its name as set forth in the preamble of this Permit and shall provide City with all documents in connection with the change.

21. Transfer of Stock. If Tenant is a corporation and more than ten percent (10%) of the outstanding shares of capital stock of Tenant is traded during any calendar year after filing its application for this Permit, Tenant shall notify Executive Director in writing within ten (10) days after the transfer date; provided, however, that this provision shall have no application in the event the stock of Tenant is listed on either the New York Stock Exchange, NASDAQ, or the NYSE Arca Options. If more than twenty-five percent (25%) of Tenant’s stock is transferred, whether by one or by means of successive transfers, regardless of whether Tenant is a publicly or privately held entity, such transfer shall be deemed an assignment within the meaning of Section 19. Any such transfer shall void this Permit. Such a transfer is agreed to be a breach of this Permit which shall entitle the Executive Director to immediately terminate this Permit by giving written notice thereof.

22. Possessory Interest. THIS PERMIT MAY CREATE A POSSESSORY INTEREST BY TENANT WHICH MAY BE SUBJECT TO PROPERTY TAXATION. TENANT SHALL PAY ALL SUCH TAXES SO ASSESSED, AND ALL OTHER ASSESSMENTS OF WHATEVER CHARACTER LEVIED UPON ANY INTEREST CREATED BY THIS PERMIT. TENANT SHALL ALSO PAY ALL LICENSE AND PERMIT FEES REQUIRED FOR THE CONDUCT OF ITS OPERATIONS.

23. Termination for Misrepresentations. This Permit is granted pursuant to an application filed by Tenant with City. If the application or any of the attachments thereto contain any misstatement of fact which, in the judgment of Executive Director, affected his or her decision to grant said Permit, Executive Director may terminate this Permit immediately upon written notice to Tenant.

24. Termination by Court. If any court having jurisdiction in the matter renders a final decision which prevents the performance by City of any of its obligations under this Permit, then either party hereto may terminate this Permit by written notice, and all rights and obligations hereunder (with the exception of any undischarged rights and obligations) shall thereupon terminate.

25. Conflict of Interest. It is understood and agreed that the parties to this Permit have read and are aware of the provisions of Section 1090 *et seq.* and Section 87100 *et seq.* of the Government Code relating to conflict of interest of public officers and employees, as well as the Conflict of Interest Code of City's Harbor Department. All parties hereto agree that they are unaware of any financial or economic interest of any public officer or employee of City relating to this Permit. Notwithstanding any other provision of this Permit, it is further understood and agreed that if such a financial interest does exist at the inception of this Permit, City may immediately terminate this Permit by giving written notice thereof.

26. Notice. In all cases where written notice, including the service of legal pleadings, is to be given under this Permit, service shall be deemed sufficient if said notice is deposited in the United States mail, in a sealed envelope, addressed as set forth below, with postage thereon fully prepaid. When so given, such notice shall be effective from the date of mailing. Unless changed by notice in writing from the respective parties, notice to the parties shall be as follows:

To City: Los Angeles Harbor Department
P.O. Box 151
San Pedro, California 90733-0151
Attention: Executive Director
Attention: Director of Real Estate

With a copy to: Office of City Attorney—Harbor Department
425 S. Palos Verdes Street
San Pedro, California 90731
Attention: General Counsel

To Tenant: American Marine Corporation
1500 Barracuda Street
Terminal Island, CA 90731

Nothing herein contained shall preclude or render inoperative service of such notice in the manner provided by law. All notice periods under this Permit refer to calendar days unless otherwise specifically stated.

27. Construction of Agreement. This Permit shall not be construed against the party preparing it and shall be construed without regard to the identity of the person who drafted this Permit.

28. No Waiver. No waiver by either party at any time of any terms or conditions of this Permit shall be a waiver at any subsequent time of the same or any other term or condition. The acceptance of Rent by City shall not be deemed a waiver of any other breach by Tenant of any term or condition of this Permit other than the failure of Tenant to timely make any particular Rent payment so accepted. No breach of a covenant, term, or condition of this Permit will be deemed to have been waived by City unless the waiver is in writing and executed by City.

29. Joint and Several Obligations of Tenant**.** If more than one individual or entity comprises Tenant, the obligations imposed on each individual or entity that comprises Tenant under this Permit shall be joint and several.

30. Time of the Essence. Time is of the essence in this Permit.

31. Nondiscrimination and Affirmative Action Provisions. Tenant agrees not to discriminate in its employment practices against any employee or applicant for employment because of employee's or

applicant's race, religion, ancestry, national origin, sex, sexual orientation, age, disability, marital status, domestic partner status, or medical condition. All subcontracts awarded under or pursuant to this Permit shall contain this provision. The applicable provisions of Section 10.8 *et seq.* of the Los Angeles Administrative Code are set forth in the attached Exhibit F and are incorporated herein by this reference.

32. Minority, Women and Other Business Enterprise (MBE/WBE/OBE) Outreach Program. It is the policy of City to provide minority business enterprises ("MBEs"), women's business enterprises ("WBEs"), and all other business enterprises ("OBEs") an equal opportunity to participate in the performance of all City contracts in all areas where such contracts afford such participation opportunities. Tenant shall assist City in implementing this policy and shall use its best efforts to afford the opportunity for MBEs, WBEs, and OBEs to achieve participation in subcontracts where such participation opportunities present themselves and attempt to ensure that all available business enterprises, including MBEs, WBEs, and OBEs, have an equal opportunity to compete for and participate in any such participation opportunity which might be presented under this Permit.

33. Service Contractor Worker Retention Policy and Living Wage Policy Requirements. Board adopted Resolution No. 5771 on January 3, 1999, to adopt the provisions of Los Angeles City Ordinance No. 171004 relating to Service Contractor Worker Retention, set forth at Section 10.36 *et seq.* of the Los Angeles Administrative Code, as the policy of City's Harbor Department. Further, Charter Section 378 requires compliance with City's Living Wage requirements, set forth at Section 10.37 *et seq.* of the Los Angeles Administrative Code. Tenant shall comply with these policies wherever applicable. Violation of this provision, where applicable, shall entitle City to terminate this Permit and otherwise pursue legal remedies that may be available.

34. Wage and Earnings Assignment Orders/Notices of Assignments. Tenant is obligated to fully comply with all applicable state and federal employment reporting requirements for Tenant and/or its employees. Tenant shall certify that the principal owner(s) are in compliance with any Wage and Earnings Assignment Orders and Notices of Assignments applicable to them personally. Tenant will fully comply with all lawfully served Wage and Earnings Assignment Orders and Notices of Assignments in accordance with Section 5230 *et seq.* of the California Family Code. Tenant will maintain such compliance throughout the term of this Permit.

35. Equal Benefits Policy. Board adopted Resolution No. 6328 on January 12, 2005, to adopt the provisions of Los Angeles City Ordinance No. 172,908, as amended, relating to Equal Benefits, set forth at Section 10.8.2.1 *et seq.* of the Los Angeles Administrative Code, a copy of which is attached as Exhibit G, as a policy of City's Harbor Department. Tenant shall comply with the policy wherever applicable. Violation of the policy shall entitle City to terminate this Permit and otherwise pursue legal remedies that may be available.

36. Business Tax Registration Certification. Tenant represents that it has obtained and presently holds the Business Tax Registration Certificate(s) required by City's Business Tax Ordinance set forth at Sections 21.00 *et seq.* of the Los Angeles Municipal Code. Tenant shall provide City evidence that all such Certificates have been obtained. Tenant shall maintain, or obtain as necessary, all such Certificates required of it under said Ordinance and shall not allow any such Certificate to be revoked or suspended.

37. Wilmington Truck Route. It is recognized by both parties that Tenant may not directly control any trucks serving the Premises. However, Tenant will make its best effort to notify truck drivers, truck brokers, and trucking companies that trucks serving the Premises must confine their route to the designated Wilmington Truck Route of Alameda Street and Harry Bridges Boulevard; Figueroa Street from Harry Bridges Boulevard to "C" Street; and Anaheim Street east of Alameda Street as depicted on the attached as Exhibit H. The Wilmington Truck Route may be modified from time to time at the sole discretion of Executive Director with written notice to Tenant.

38. State Tidelands Act. This Permit, the Premises, and Tenant's use and occupancy thereof shall at all times be subject to the limitations, conditions, restrictions, and reservations contained in and prescribed by the Act of the Legislature of the State of California entitled "An Act Granting to the City of Los

Angeles the Tidelands and Submerged Lands of the State Within the Boundaries of Said City," approved June 3, 1929 (1929 Cal. Stats., Ch. 651), as amended, and Article VI of the Charter of City of Los Angeles relating to such lands. Tenant shall not undertake any use of the Premises, even a Permitted Use, which is or will be inconsistent with such limitations, conditions, restrictions, and reservations.

39. Section Headings. Section headings used in the Permit are merely descriptive and not intended to alter the terms and conditions of the sections.

40. Integrated Agreement. It is understood that this Permit supersedes and cancels any and all previous negotiations, arrangements, representations, agreements, negotiations, and understandings, if any, between the parties related to the subject matter of this Permit and there are no oral agreements that affect any of the terms of this Permit.

41. Amendments. No provision of this Permit may be amended except by an agreement in writing signed by City and Tenant. Any such modifications are subject to all applicable approval processes set forth in City's Charter, City's Administrative Code, or other applicable law.

42. Governing Law and Venue. This Permit is made and entered into in the State of California and shall in all respects be construed, interpreted, enforced, and governed under the laws of the State of California without reference to choice of law rules. Any action or proceeding arising out of or related to this Permit shall be filed and litigated in the state or federal courts located in the County of Los Angeles, State of California.

43. Prior Permit Superseded. Where this Permit supersedes a previous permit or other entitlement granted by City to Tenant, from and after the Effective Date, said superseded permit or other entitlement shall have no further force or effect except to the extent either party has accrued any continuing rights or obligations that remain to be exercised or performed after the termination or expiration of the superseded permit or other entitlement as provided in the superseded permit or other entitlement.

[Signature page on following page]

DATED: _____

CITY OF LOS ANGELES
HARBOR DEPARTMENT

By: _____
EUGENE D. SEROKA
Executive Director

The undersigned Tenant hereby accepts the foregoing Permit and agrees to abide by, to be bound by, and to observe each and every of the terms, conditions, and covenants thereof, including those set forth in any addendum.

DATED: 3/14/2022

AMERICAN MARINE CORPORATION

By: _____
ROBERT M. SHAHNAZARIAN, PRESIDENT
Type/Print Name and Title

Attest: Megan Keane
Megan Keane / Vice President
Type/Print Name and Title

APPROVED AS TO FORM AND LEGALITY

_____, 2022
MICHAEL N. FEUER, City Attorney

By: _____
MINAH PARK, Deputy

EXHIBIT A

LINE TABLE		
NO.	BEARING	DISTANCE(FT)
L1	N86°22'59"W	1.25
L2	N53°17'17"W	58.42
L3	N89°50'09"W	20.00
L4	N41°54'27"E	42.39
L5	N0°11'58"E	66.49
L6	N0°11'58"E	78.58
L7	N89°50'12"W	3.00
L8	N0°11'58"E	518.43
L9	N39°21'01"E	536.76
L10	N49°52'49"W	45.49
L11	N39°30'59"E	21.18
L12	N49°52'49"W	3.00
L13	N39°30'59"E	42.56
L14	N50°29'02"W	12.00
L15	N50°43'44"W	50.00
L16	N39°31'04"E	479.46
L17	N0°09'48"E	660.70
L18	N89°50'12"W	50.00
L19	N0°09'48"E	232.15
L20	N0°09'48"E	230.75

LINE TABLE		
NO.	BEARING	DISTANCE(FT)
L21	N20°12'43"E	30.97
L22	N20°12'43"E	30.97
L23	N0°09'48"E	357.70
L24	N0°09'48"E	362.68
L25	N26°39'22"W	20.18
L26	N26°39'22"W	20.18
L27	N0°09'48"E	46.30
L28	N0°09'48"E	44.16
L29	N6°46'42"W	25.50
L30	N6°46'42"W	23.41
L31	N19°40'19"E	58.70
L32	N19°40'19"E	52.52
L33	N50°54'32"E	53.03
L34	N50°54'32"E	50.87
L35	N39°30'58"E	505.41
L36	N39°30'58"E	506.61
L37	N39°30'58"E	483.88
L38	N27°50'08"E	4.91
L39	N59°38'35"W	2.42
L40	N30°21'25"E	20.03

LINE TABLE		
NO.	BEARING	DISTANCE(FT)
L41	N18°04'42"E	8.62
L42	N70°40'17"W	5.36
L43	N19°19'43"E	29.63
L44	N71°57'10"W	5.19
L45	N18°02'50"E	11.85
L46	N7°07'01"E	18.06
L47	N89°50'12"W	1.33
L48	N0°09'48"E	44.80
L49	N89°50'12"W	2.30
L50	N0°09'48"E	636.73
L51	N86°22'59"W	21.09
L52	N86°22'59"W	12.02
L53	N86°22'59"W	18.43

CURVE TABLE				
NO.	RADIUS(FT)	DELTA (D-M-S)	LENGTH(FT)	TANGENT(FT)
C1	199.46	24°27'57"	85.17	43.25
C2	246.79	35°34'39"	153.24	79.18

RADIAL TABLE	
LINE NO.	BEARING
R1	N61°24'48"W
R2	S85°52'45"E
R3	N52°18'36"W
R4	S87°53'14"E

NOTES:

1) NO SUBSTRUCTURES ARE SHOWN ON THIS DRAWING. ACCURATE SUBSTRUCTURE INFORMATION MUST BE OBTAINED FROM LESSEES AND L.A.H.D. ENGINEERING RECORDS.
2) HORIZONTAL DATUM IS BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD 83), CALIFORNIA COORDINATE SYSTEM, ZONE 5, FEET.
3) ALL DISTANCES SHOWN ON THIS DRAWING ARE GRID DISTANCES. TO OBTAIN A REASONABLE REPRESENTATION OF THE GROUND DISTANCE, DIVIDE THE DISTANCE HEREIN BY THE AVERAGE SCALE FACTOR OF 1.000076.

NO.	DATE	DRAWN	REVISIONS -	CHK'D	APP'D
1	12/18	DRR	ADDED PARCEL NO. 4 AND CHANGED TENANT NAME	DRR	[signature]
2	06/21	PH	REVISED PARCEL NOS. 1, 2, 3,& 4 AND DELETED PARCEL NO. 1A	[signature]	[signature]

SCALE: AS SHOWN
DRAWN: PSOMAS 4/03
CHECKED: PSOMAS 4/03
DESIGNED: PSOMAS 4/03
ENGINEER / ARCHITECT
CHIEF OF DESIGN
ASSISTANT CHIEF HARBOR ENGINEER
CHIEF HARBOR ENGINEER 5/5/03 DATE

PERMIT MAP - AUTHORITY NO. RP21-20

AMERICAN MARINE CORPORATION

THE PORT OF LOS ANGELES
ENGINEERING DIVISION
425 S. PALOS VERDES STREET SAN PEDRO CA 90731-3309

DRAWING NUMBER | SHEET NUMBER 1-2021-2 REV2

AMERICAN MARINE CORP.
EXHIBIT Y

To		From
	BOARD OF HARBOR COMMISSIONERS	
	EXECUTIVE DIRECTOR	
	DED & CHIEF OF STAFF	
	DED & CHIEF FINANCIAL OFFICER	
	CHIEF OF PUBLIC SAFETY & EMERG MGT	
	DED - MKTG & CUSTOMER RELATIONS	
	DED - DEVELOPMENT	
	SR DIRECTOR, COMMUNICATIONS	
	SR DIRECTOR, GOVERNMENT AFFAIRS	
	ACCOUNTING	
XX	CARGO/INDUSTRIAL REAL ESTATE	
	CARGO MARKETING	
	CITY ATTORNEY	
	COMMISSION OFFICE	
	COMMUNITY RELATIONS	
	CONSTRUCTION	
	CONSTRUCTION & MAINTENANCE	
	CONTRACTS & PURCHASING	
	DEBT & TREASURY MANAGEMENT	
	EMERGENCY MANAGEMENT	

CITY OF LOS ANGELES
HARBOR DEPARTMENT

OFFICE MEMORANDUM

April 12, 2018

To		From
	ENGINEERING	XX
	ENVIRONMENTAL MANAGEMENT	
	FINANCIAL MANAGEMENT	
	GOODS MOVEMENT	
	GRAPHICS	
	HUMAN RESOURCES	
	INFORMATION TECHNOLOGY	
	LEGISLATIVE AFFAIRS	
	MANAGEMENT AUDIT	
	MEDIA RELATIONS	
	PLANNING & STRATEGY	
	PORT PILOTS	
	PORT POLICE	
	RISK MANAGEMENT	
	TRADE DEVELOPMENT	
	WATERFRONT/COMM REAL ESTATE	
	WHARFINGERS	

SUBJECT: RECOMMENDATION TO CLOSE REPAIR PROJECT FOR BERTHS 270-271 SEAWALL

Recommendation:

The Engineering Division has been pursuing an investigation of sinkholes behind the concrete sheet pile wall at Berths 270-271 and the design of a repair for several years. Due to the estimated cost of the project, the relative cost of ongoing repairs, the difficulty of relocating the tenant, and the probability that the seawalls will be incorporated into a Confined Disposal Facility in the next 5 to 10 years, the Engineering Division recommends that work on a permanent structural solution to the sinkholes should stop and that as-needed repairs continue.

In addition, if the tenant is to remain on site, the Engineering Division recommends that cleats be installed in the backland behind the wall for tie-up of the tenant's vessels. The existing concrete sheet pile wall is not designed for the tenant's current practice of tying vessels to the scuppers of the wall. The cleats can be constructed by the Harbor Department or by the tenant under an APP.

Background:

In response to a memo dated April 13, 2011, requesting assistance with the seawall at Berths 270-271, as well as several others, the Engineering Division performed an analysis of the existing seawall. This analysis determined that while the existing concrete sheet pile wall was structurally sound, sinkholes behind the wall were occurring due to the loss of material through the joints of the concrete sheet pile walls. Several options were investigated to repair the joints, with the most promising being the construction of a cast in place buttress on the water side of the walls. The cost for this project was estimated at $2.5 to $3 million.

After sharing this with Tom Patton and Sumita Thappa of the Cargo / Industrial Real Estate Division,

EXHIBIT Y (pg 2)

an effort to relocate the tenant instead of committing to the large capital expense was initiated. Suitable premises at Berths 151-153 were proposed, as well as a consolidation of waterside operations to the northern portion of the site and use of an existing warehouse, but were unacceptable to the tenant.

At a meeting on March 6, 2018, the tenant indicated that they had encountered few sinkholes in the previous five years and that they preferred to stay in their current location and could accommodatethe inconvenience of future sinkhole repairs.

The Engineering Division checked with Frank Albers of Construction & Maintenance, who provided a list of five pavement repair projects that had been performed at the Berths 270-271 site since 2010. The total cost of the repairs, including one project performed by the Engineering Division, was approximately $125,000. Based on an average cost of less than $16,000 per year to repair sinkholes, it is difficult to justify an expenditure of $2.5 to $3 million project for a seawall that will likely be incorporated into a fill in the next ten years.

If you have any questions regarding this matter, please contact Chris Brown of my staff at310-732-3666.

DAVID M. WALSH, P.E.
Chief Harbor Engineer

CB:dw
106118
25409 4-1


Exhibit C - American Marine Corporation
Fencing Maintenance Responsibility
Legend
American Marine
Harbor Department
Marina St
Google Earth
N
800 ft

EXHIBIT D

Attachment X

Dive Report Requirements

SECTION 14

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

14. INSPECTION OF RETAINING STRUCTURES

The three primary types of concrete retaining structures within the Port are:

- Gravity Walls
- Sheet Piling
- Curtain Walls

The gravity wall construction typically dates to 1960 and earlier, the sheet piling construction to circa 1960, and the curtain wall construction to later than 1960.

The typical gravity wall construction, illustrated in Figure 14-1, is founded on the riprap shelf at the top of the slope, and is typically tapered along its outboard face, although the walls at some wharves are tapered along their inboard face. At some wharves, the walls are braced against the inboardmost row of piles with diaphragms, while at other wharves, the walls are anchored to deadmen via steel tie rods as shown in Figure 14-1. There is a cold joint between the concrete for the gravity wall and the concrete for the remainder of the wharf structure, as the two are not cast integrally, and they are not tied together with reinforcing steel.

The typical sheet piling construction is depicted in Figure 14-2. The sheet piling, which is prestressed, is typically keyed into and supports the rear marginal beam. The exposed portion of the sheet piling is completely above MLLW.

Figure 14-3 depicts the typical curtain wall construction. The wall is typically keyed into the rear marginal beam or deck slab, and is founded on, or slightly below, the riprap shelf at the top of the slope.

Although the aforementioned concrete retaining structures constitute the overwhelming majority within the Port, there are some special cases which include:

- a curtain wall founded on the riprap shelf, with a concrete sheet pile cutoff wall below it
- a gravity wall founded on the shelf, with a timber sheet pile cutoff wall below it
- a dropped deck slab supported on piles

The inspection of retaining structures constructed of materials other than reinforced concrete is not discussed in this manual, even where they are a part of otherwise all-concrete wharves. Such retaining structures include timber sheet piling and concrete rubble walls.

14.1 TYPICAL DEFECTS

This section describes the typical defects that are specific to retaining structures, and supplements the general description of typical defects presented in Section 4. The defects described below, as they relate to retaining structures, are illustrated on the reverse side of both the Regular Above Water Inspection Worksheet for Retaining Structure and the Principal Inspection Field Form for Retaining Structure, which are discussed in Sections 14.3.4 and 14.3.5, respectively.

Breakage of a gravity wall can occur due to a loss of support below the wall. If the loss of support is along a length sufficient to significantly overstress the wall, breakage will result. Breakage of sheet piling will most likely result from overstressing due to an overload behind (inboard of) the sheet piling and/or a loss of slope protection accompanied by erosion of the soil in front of the sheet piling. The breakage would most likely occur at or above the mudline. Breakage of the curtain wall will likely occur at the top, where it meets the deck slab. It would likely be due to an overload behind the wall.

Mechanical damage is not typically found on retaining structures, except in cases where debris continuously floats beneath the berth. In fact, the exposed portions of the retaining structures are typically located above the tidal zone, so mechanical damage due to debris can only occur in the event of a high tide and/or storm. The retaining structures at the outboard corners of the berth would likely sustain the most damage.

Overstressing cracks will most likely result from the same causes as breakage. They tend to be oriented vertically (i.e., cross cracks) on gravity walls, and horizontally (i.e., longitudinal cracks) on sheet piles and curtain walls.

General cracks will occur on gravity walls or curtain walls due to shrinkage, if the construction joints and control joints were not properly spaced when the wall was built. The general cracks would likely consist of a series of vertical (i.e., cross) cracks, fairly evenly spaced along the length of the wall. This type of cracking is not typically found on sheet piling.

Corrosion cracks can occur on any of the retaining structures. However, they are more likely to occur on

EXHIBIT D

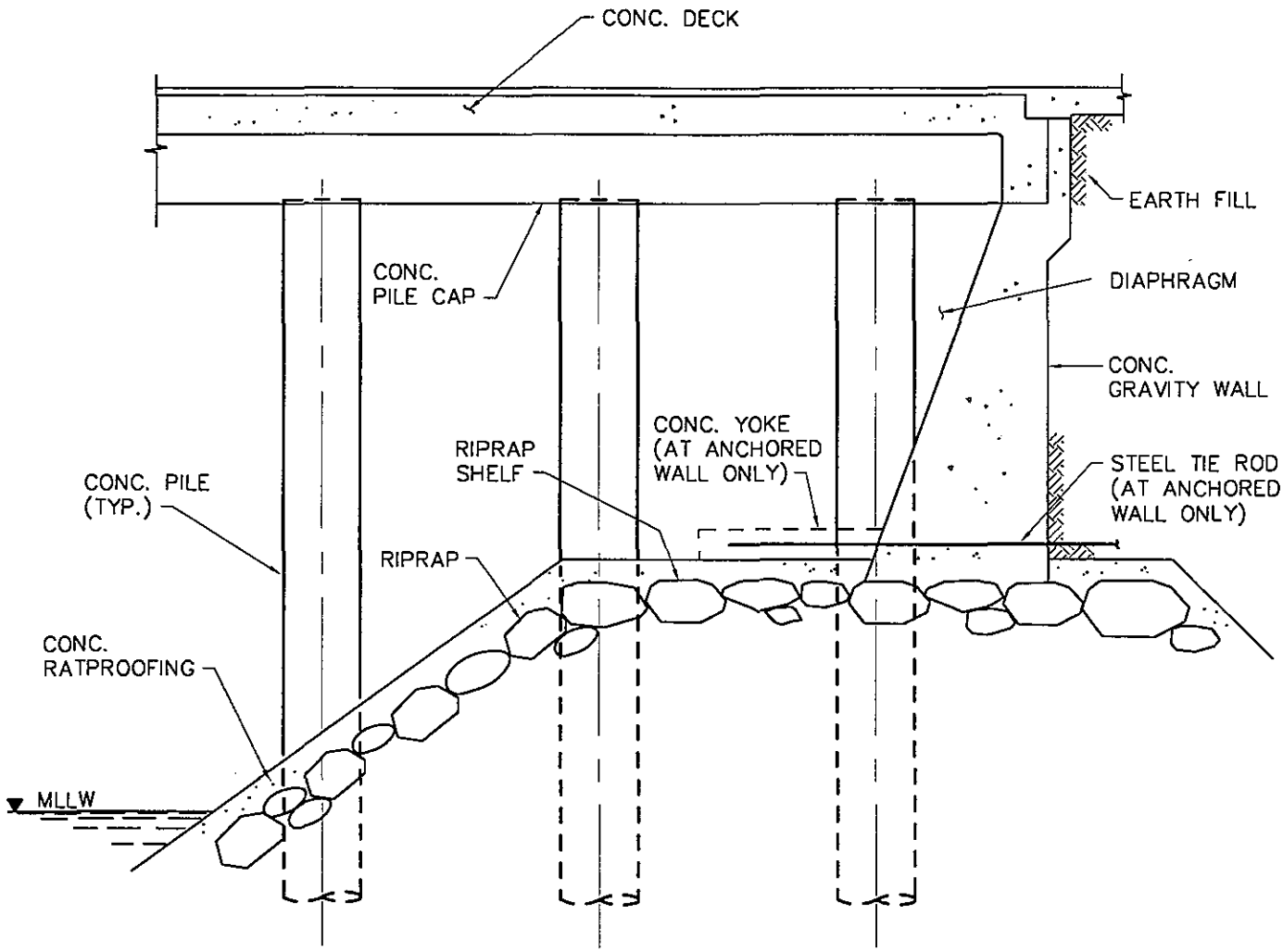


FIGURE 14–1
RETAINING STRUCTURES
TYPICAL GRAVITY WALL
WATERFRONT FACILITIES
INSPECTION & MAINTENANCE PROGRAM

EXHIBIT D

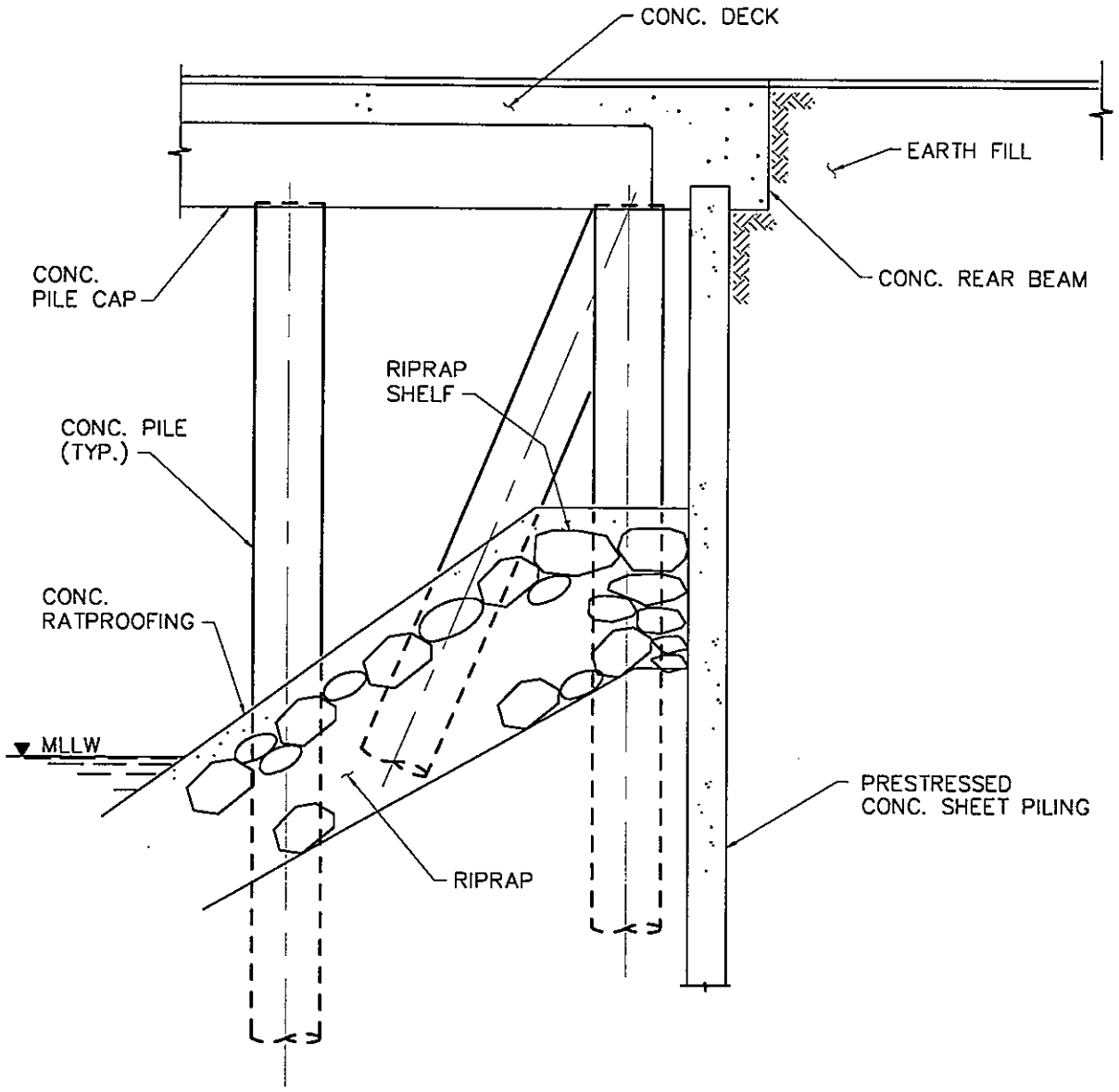


FIGURE 14–2
RETAINING STRUCTURES
TYPICAL SHEET PILING
WATERFRONT FACILITIES
INSPECTION & MAINTENANCE PROGRAM

EXHIBIT D

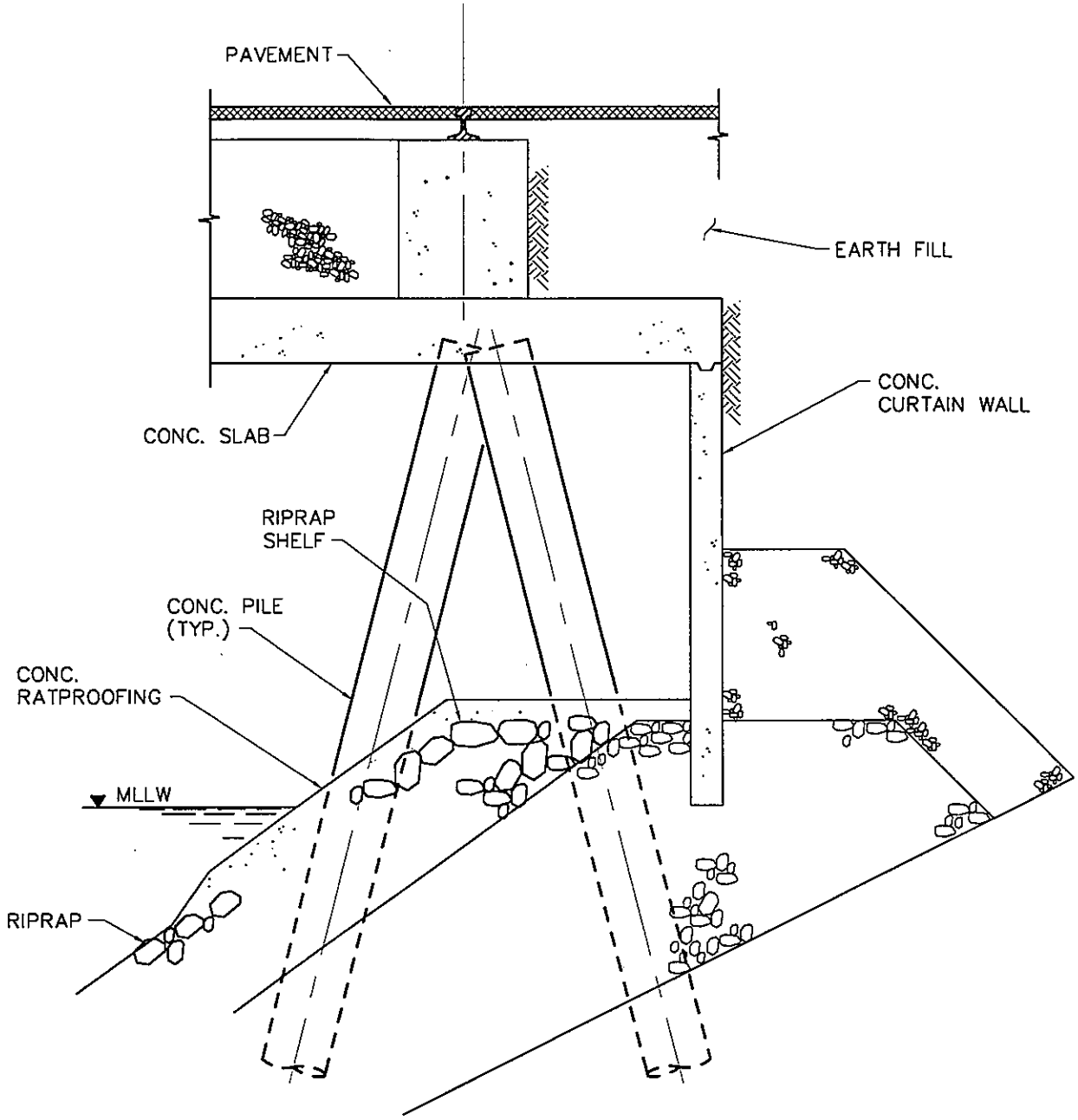


FIGURE 14–3
RETAINING STRUCTURES
TYPICAL CURTAIN WALL
WATERFRONT FACILITIES
INSPECTION & MAINTENANCE PROGRAM

gravity walls and curtain walls. If they are found on sheet piling which is prestressed, they should be reported immediately. A discussion of the structural consequences associated with corrosion cracks on non-prestressed and prestressed components was presented in Section 4.6.5. Corrosion cracks often result from improper cover on the reinforcing steel during construction, and are oriented either vertically (i.e., cross cracks), or horizontally (i.e., longitudinal cracks), depending upon the direction of the outer layer of reinforcing. The splashing action of reflected standing waves causes increased corrosion cracking on retaining structures.

Corrosion spalls can similarly occur on any of the retaining structures described above. Corrosion spalls can be either closed or open. They will occur if corrosion cracks significantly worsen, as discussed in Section 4.8. The splashing action of reflected standing waves causes increased corrosion spalling on retaining structures. As mentioned above for corrosion cracks, the structural consequences of corrosion spalls on prestressed and non-prestressed sheet piles are different, as discussed in Section 4.6.5.

Erosion of retaining structures within the Port is evidenced primarily by "crumbling" and "rounding" of the corners of old concrete sheet piles in the tidal zone. The process is a long-term deterioration in service caused by a combination of alternate wetting and drying, chemical (sulfate) attack and tidal/wave action.

Corners are the most typical locations for this kind of damage because concrete is exposed to each of the aggressive factors mentioned above from two sides. As a result of the "rounding" of two adjacent corners, a local recess between individual sheet piles may eventually develop.

The primary consequence of erosion of this type is a reduction in concrete cover, and the associated increase in the rate of corrosion of reinforcement. In some particularly advanced cases of erosion, leakage of fill through the gap between sheets may occur.

14.2 SETTLEMENT-RELATED DAMAGE

Settlement is a phenomenon which can lead to breakage and overstressing cracks. In evaluating the effects of settlement it is important to determine whether the settlement is ongoing, and if so, the rate at which it may be increasing.

Settlement will most likely be encountered only at gravity walls, because sheet piling is typically founded at a lower elevation, on better soil, and curtain walls are typically supported from the slab or rear marginal beam above. The settlement may result from any of the following causes:

- consolidation of the soil underlying the wall
- erosion of the slope outboard of the wall, eventually leading to erosion or settlement of the soil below the toe of the wall
- overall slope stability failure

Consolidation of the soil underlying the wall occurs because of the compressive stresses developed in it due to load application. The load in this case includes the dead load of the wall and the resultant lateral load on the wall from the soil and live load inboard of the wall. Assuming that the foundation of the wall is properly designed, and that it is not subjected to loads in excess of the design load, the settlement probably will have completely subsided, or will be occurring at a rapidly diminishing rate. However, if the wall is overloaded, the rate of settlement may be increasing. This overload could be the result of tie rod failure. If this is the case, an evaluation of both the retaining structure and entire wharf should be performed.

Erosion of the slope outboard of the wall may eventually lead to exposure of the soil underlying the wall. Once this soil becomes exposed, it is more susceptible to erosion as well, resulting in lack of support for the toe of the wall, and consequent settlement and rotation. Once the wall has lost some support, the situation will probably continue to worsen, potentially leading to overstressing of the wall and/or overall soil failure. Evaluating the latter requires a special engineering review, which is beyond the scope of this manual.

Examples of settlement of retaining structures at POLA wharves are illustrated in Photos 14-1 through 14-3. Photo 14-1 shows a gap between the top of the retaining structure and the bottom of the rear marginal beam. This particular retaining structure, a gravity wall, is braced against each inboardmost-row pile by a diaphragm. There is also a gap between the top of the diaphragm and the bottom of the pile cap. These gaps indicate that the wall has settled. In fact, as evidenced by the photo, the top layer of concrete from the wall is still bonded to the bottom of the rear marginal beam.

PHOTO 14-1. Gap between top of retaining structure (gravity wall) and bottom of rear marginal beam (right side of photo). Also note gap between top of diaphragm and bottom of pile cap (left side of photo).

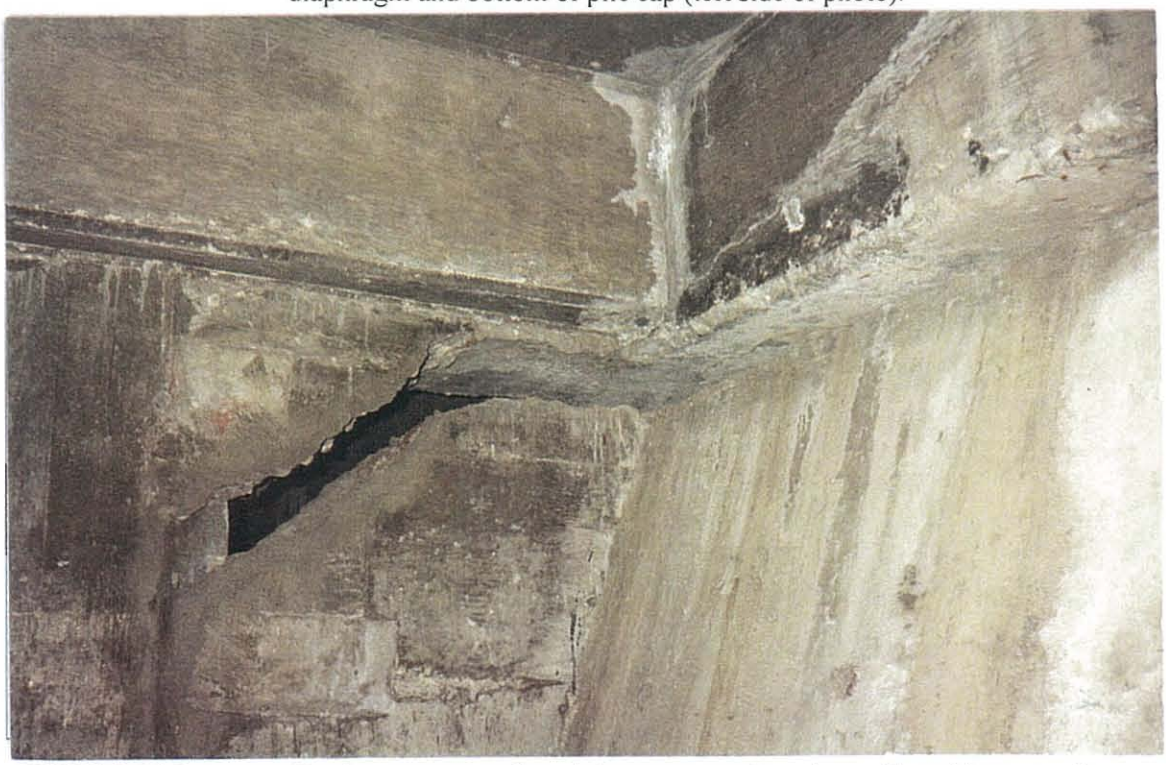


PHOTO 14-2. Gap between top of retaining structure (gravity wall) and bottom of rear marginal beam (right side of photo). Also note gap between top of diaphragm and bottom of pile cap, and a diagonal crack which has opened up into a gap in the diaphragm adjacent to pile (left side of photo).

PHOTO 14-3. Crack and small gap between top of retaining structure (gravity wall) and bottom of rear marginal beam, indicating that retaining structure is setting. (Note that the structure was constructed with a cold joint between the two.)

Photo 14-2 shows a similar condition. However, in this case the diaphragm wall has developed a diagonal crack adjacent to the pile, which has opened as a result of the settlement. Any damage to the diaphragm walls noted during the inspection should be identified in a comment. Photo 14-3 shows a crack between the top of the wall and bottom of the rear marginal beam. As mentioned previously, the two components were originally designed with a cold joint between them. The fact that there is now a crack, and it is starting to open in places, indicates that some settlement has occurred, although it is very small at this time. Whenever settlement is found, an engineering evaluation should be performed to determine its cause, and whether it is continuing.

14.3 REGULAR ABOVE WATER INSPECTION

14.3.1 Scope Overview

As described in Section 7.1, a RAWI of a retaining structure essentially includes identifying the type of structure being inspected, (i.e., gravity wall, sheet piling, or curtain wall) and a one hundred percent visual inspection of the retaining structure. Only the defects exceeding in size those indicated in Table 5-1 should be documented. The results of the inspection are then used to determine whether a Principal Inspection is required. The condition of the retaining structure is important for assigning an Overall Repair Priority Rating.

14.3.2 Procedures

A RAWI of a retaining structure should be conducted according to the general guidelines and procedures outlined in Section 7. In order to ensure that the entire portion of the retaining structure which is above the mudline is visible, the inspection should be conducted when the water level is at or near low tide, if possible. The inspection is visual and should be performed by motoring or rowing a small boat along the structure. However, in some situations, the Inspectors may find it more efficient to conduct the inspection by walking along the concrete ratproofing. This can be done simultaneously with the inspection of the rear marginal beam and top of slope, described in Sections 12 and 15, respectively.

The anticipated defects are identified in Sections 14.1 and 14.2, and on the reverse side of the RAWI Worksheet. In most cases, the easiest way to measure settlement is to note the size of the gap between the top of the retaining structure and the bottom of the deck or rear marginal beam. Settlement measurements should be approximated by eye. A tape measure should be used if there is any doubt as to whether any settlement meets the PI criteria of 3 in. or greater discussed in Section 14.3.3.

One of the primary objectives of the RAWI is to determine the approximate number or percentage of affected components for each type of defect. These percentages are compared to the PI criteria, which are defined in Section 14.3.3. In addition, any damage requiring emergency action and any unusual defects, such as settlement and rotation, should be identified. This damage includes any effect that movement of the retaining structure may have on adjacent component types.

14.3.3 Criteria for Principal Inspection

As mentioned above, the results of the RAWI will establish the need for and scope of a PI by determining whether the number or percentage of affected components for each defect type is greater than or equal to the corresponding PI criterion. These criteria, which are a function of the severity or extent of the defects, were discussed in Section 7.5, are summarized in Table 14-1, and also identified on the RAWI Worksheets.

As indicated in Table 14-1, a PI is required for non-prestressed retaining structures if the number of components affected by either corrosion cracks, closed corrosion spalls, or open corrosion spalls represents greater than forty percent of all the components.

As discussed in Section 7.5, the areas (or sections of the inspection unit) to which the PI criteria are applied, are determined in the field by Inspectors, based on their evaluation of the actual distribution of defects on the retaining structure.

No specific criteria are provided for mechanical damage and general cracks, as the presence of these defects will generally not require a PI. However, the Inspectors should note any cases of extensive defects of these types, and enter this information into the comment section of RAWI Summary Form.

Notification of any Emergency Conditions observed should be made according to Section 7.9 as necessary.

TABLE 14-1
ABOVE WATER PRINCIPAL INSPECTION CRITERIA FOR RETAINING STRUCTURE

Defect	Prestressed	Non-Prestressed
Breakage	occurrence*	occurrence*
Overstressing Crack	occurrence*	occurrence*
Corrosion Crack	occurrence*	forty percent or more of components affected
Closed Corrosion Spall	occurrence*	forty percent or more of components affected
Open Corrosion Spall	occurrence*	twenty-five percent or more of components affected
All Types of Corrosion Defects	occurrence*	forty percent or more of components affected
Erosion	ten percent or more of components affected	twenty-five percent or more of components affected
Settlement	greater than 3 in. at any location	3 in. or greater

* a PI is required if there is at least one occurrence of the defect

14.3.4 Recording Findings

The approximate number or percentage of components affected by each of the defects described in Sections 14.1 and 14.2, and their locations, should be identified on the RAWI worksheets. A sample worksheet for non-prestressed retaining structures is provided on the following page, with typical data entered. When recording settlement, Columns 4 and 5 should be used to indicate the number and percentage of components which have settled, regardless of the amount of the settlement. The number and location of components meeting the PI criteria for settlement, i.e., 3 in. or greater, should be indicated in the comments. Any other clarifying information, regardless of the defect type, should also be entered in the "Comments" field.

The information from the worksheets should be used for input into the Summary of Regular Above Water Inspection form, which is described in Section 7.6. The contents for the Summary Form are recorded in the AIRIS Database.

14.4 REGULAR UNDERWATER INSPECTION

14.4.1 Scope Overview

Section 7.1 describes the overall scope of Regular Inspections. Some of the retaining walls within the Port have a submerged portion. As described in Section 11.4, the Regular Underwater Inspection of retaining walls is performed as part of the RUWI for piles (underwater slope is inspected as well).

The scope of the RUWI for retaining walls, where submerged portions are encountered, includes a Level I inspection of 100 percent of the retaining structure from El +3 MLLW to the mudline, as well as Level II inspection of representative areas as described below.

14.4.2 Procedures

The general procedures for executing RUWIs is described in Section 7. The procedure for executing RUWIs differs significantly from that for RAWIs due to limited underwater visibility and the need to remove marine growth. The inspection is performed on a representative sample of components.

A Level I "swim-by" inspection, described in Section 7.1.2, should be performed on 100 percent of the retaining structure from El +3 MLLW to the mudline. The representative sampling of retaining structure components for the Level II inspection should include the removal of marine growth for detailed inspection at every third pile bent. An area of 1 ft by 1 ft square should be cleaned of marine growth at three elevations to facilitate the inspection. For retaining structures with submerged portions less than 10 ft in length, the number of elevations to be cleaned should be reduced in accordance with the following criteria:

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

RETAINING STRUCTURE

BERTH NUMBER(S): 142-144 **BENT NOS:** 258-292 **INSPECTION UNIT:** 91

INSP. REQUEST DATE: 7-26-96 **INSPECTOR:** T. Klement **PAGE** 1 **OF** 2

FIELD DATA			PRINCIPAL INSPECTION REQUIREMENT								
			GENERAL							LOCAL	
			INSPECTION UNIT			LIMITED AREA					
DEFECT TYPE	LOCATION OF AFFECTED COMPONENTS	COMMENTS	NUMBER OF COMPONENTS		PERCENT AFFECTED	NUMBER OF COMPONENTS		PERCENT AFFECTED	CRITERIA	CHECK IF SIGNIFICANT LOCALIZED DEFECT(S)	YES / NO
			AFFECTED	TOTAL		AFFECTED	TOTAL				
1	2	3	4	5	6	7	8	9	10	11	12
Breakage									Occurrence *		
Overstressing Crack	258/258.2, 265.1/266, 267.2/268.1, 269.2/270.1, 271.1/272, 272/272.2, 272.2/273.1, 273.1/274.1	B	19	41	46%				Occurrence *		Yes
General Crack									----- (1)		
Corrosion Crack	259.1/260(y), 260/260.2(y), 261.1/262.1(y), 262.1/263(y), 263/263.2(y), 264.1/265.1(y), 264.1/265.1, 267.2/263.1(y)	D	21	41	51%				40% or more of components affected		Yes
Closed Corrosion Spall	258/258.2, 258.2/259.1, 260/260.2, 262.1/263, 263.2/264.1, 265.1/266 266/266.1, 266.1/267.2	A	16	41	39%				40% or more of components affected		No
Open Corrosion Spall	290/291		1	41	2%				25% or more of components affected		No
All Types of Corrosion Defects	See listings above		38	41	93%				40% or more of components affected		Yes
Mechanical Damage									----- (1)		
Settlement	290/291, 291/292	C	2	41	5%				3" or greater		No
Erosion									25% or more of components affected		

COMMENTS

A: 271.1/272, 272/272.2, 272.2/273.1, 274.1/275, 275/275.1, 279/280, 280/281, 268.1/269

B: 276.1/277.1, 277.1/278, 280/281, 288/289, 289/290, 290/291, 291/292, 262.1/263, 266.1/267.2, 268.1/269, 285/286

C: Maximum settlement at retaining structure is 1.25"

D: 268.1/269(y), 269/269.2(y), 272.2/273.1(y), 273.1/274.1(y), 274.1/275(y), 275.1/276.1(y), 277.1/278(y)

(1) THIS DEFECT WILL GENERALLY NOT REQUIRE A PRINCIPAL INSPECTION.
* A PI IS REQUIRED IF THERE IS AT LEAST ONE OCCURRENCE OF THIS DEFECT.

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

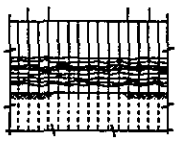
RETAINING STRUCTURE

BREAKAGE - GRAVITY WALL

ELEVATION

MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE VERTICAL DEFLECTIONS.

BREAKAGE - SHEET PILING



ELEVATION

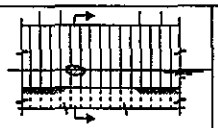
MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE LATERAL DEFLECTIONS.

BREAKAGE - CURTAIN WALL

ELEVATION

MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE LATERAL DEFLECTIONS.

MECHANICAL DAMAGE

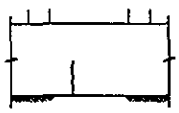


ELEVATION

SECTION

RECESS IN CONCRETE COVER CAUSED BY IMPACT OR CONTINUOUS FRICTION, WITH NO EXPOSED REINFORCING STEEL.

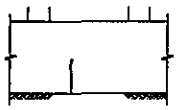
OVERSTRESSING CRACK



ELEVATION

CRACK RESULTING FROM HIGH INTERNAL STRESSES THAT EXCEED STRENGTH OF CONCRETE. OVERSTRESSING CRACKS GENERALLY TEND TO BE CROSS. (NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE)

GENERAL CRACK



ELEVATION

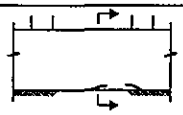
ANY CRACK NOT RESULTING FROM OVERSTRESSING OR CORROSION. APPEARANCE, LOCATION, AND ORIENTATION ARE VARIABLE.

CORROSION CRACK

ELEVATION

SPLITTING CRACK RESULTING FROM EXPANSION OF CHEMICAL PRODUCTS GENERATED BY CORROSION OF REINFORCING STEEL. CRACKS ARE GENERALLY ORIENTED ALONG REINFORCING BARS. RED, ORANGE, OR BROWN CORROSION PRODUCTS MAY BE OBSERVED LEACHING FROM CRACK.

CLOSED CORROSION SPALL

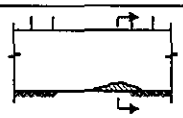


ELEVATION

SECTION

RECESS IN CONCRETE SURFACE CAUSED BY INCOMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. CRACKS ENCIRCLING OR NEARLY ENCIRCLING A FRAGMENT OF CONCRETE INDICATE THAT THE FRAGMENT IS ABOUT TO SPALL OFF.

OPEN CORROSION SPALL

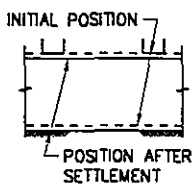


ELEVATION

SECTION

RECESS IN CONCRETE SURFACE CAUSED BY COMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. REINFORCING STEEL IS VISIBLE AND MAY BE COVERED WITH CORROSION PRODUCTS.

SETTLEMENT



ELEVATION

DOWNWARD MOVEMENT CAUSED BY CONSOLIDATION OF UNDERLYING SOIL AND/OR EROSION OF SLOPE.

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

Submerged Length (distance below MLLW)	No. of Areas
> 10 ft	3
5 ft to 10 ft	2 (top and bottom)
< 5 ft	1 (middle)

The findings should first be recorded directly on the master sketches, as shown in the example on the following page. Records from the master sketches should then be transferred to the field forms, as shown in the example on the second page following. Information illustrating the guidelines for recording defects is presented on the reverse side of the RUWI Field Form.

14.4.3 Criteria for Principal Inspection

The need for a PI is established by determining whether the number or percentage of defects of any type meet the corresponding criteria. These criteria were discussed in Section 7.5, are summarized in Table 14-2, and are also identified on the RUWI worksheets.

Notification of any emergency conditions observed should be made according to Section 7.9 as necessary.

14.4.4 Recording Findings

The data from the RUWI Field Forms should be transferred to the RUWI Worksheets. A sample worksheet is shown on the third page following, with typical data entered. Copies of the blank worksheets are provided in the Appendix.

The information form the RUWI Worksheets should be used for input into the Summary of Regular Underwater Inspection Form, which is described in Section 7.6. The contents of the Summary form are recorded in the AIRIS Database.

14.5 PRINCIPAL INSPECTION

A Principal Inspection may be performed either above water or underwater. During a PI of the retaining structure, only defects which meet or exceed the criteria indicated in Table 5-1 should be recorded. Refer to Section 8 for detailed guidelines on conducting Principal Inspections. Parameters to be recorded for each type of defect are discussed below.

TABLE 14-2
UNDERWATER PRINCIPAL INSPECTION CRITERIA FOR RETAINING STRUCTURE

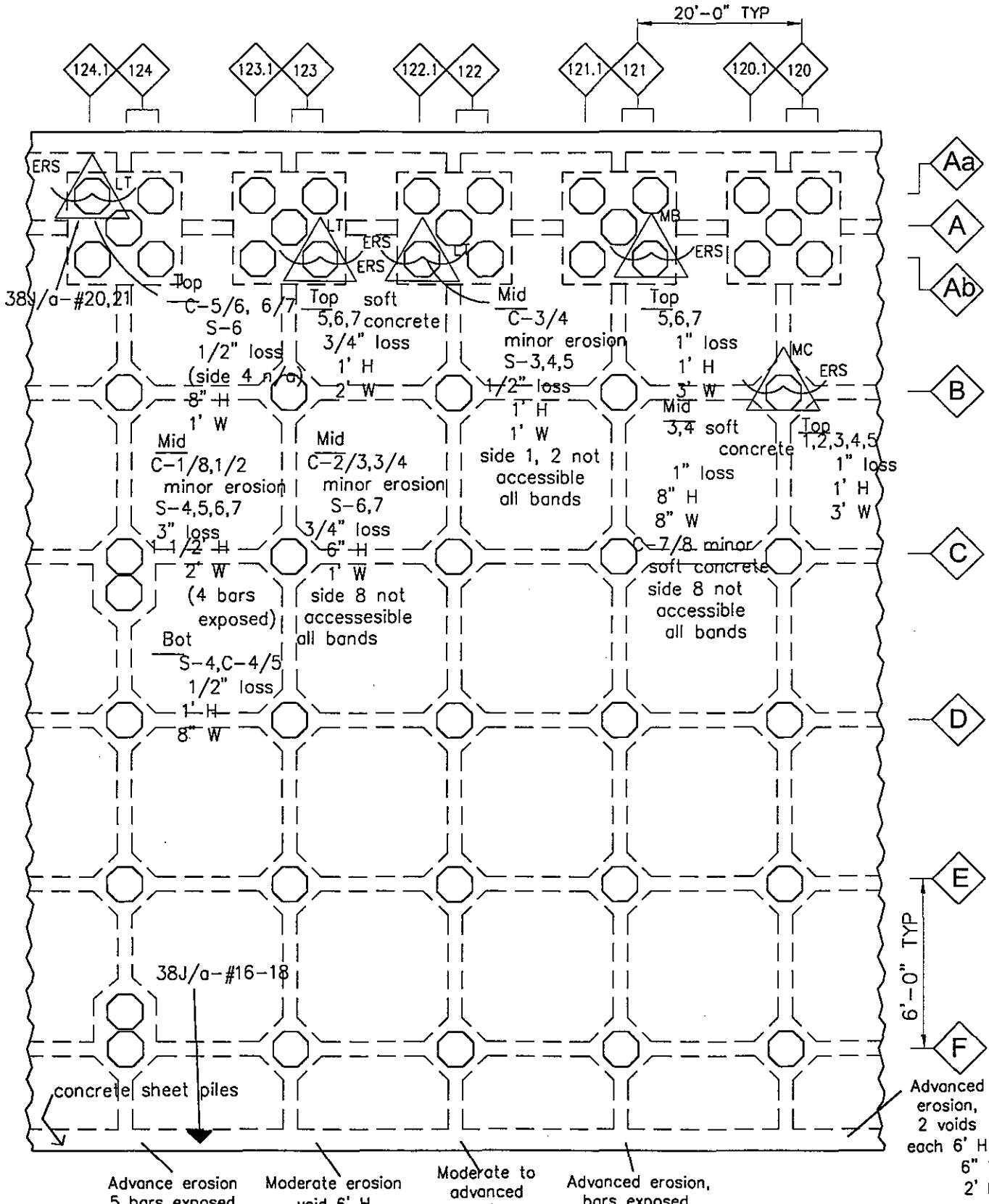
Defect	Prestressed	Non-Prestressed
Breakage	occurrence*	occurrence*
Overstressing Crack	occurrence*	occurrence*
Underwater Crack	occurrence*	twenty percent or more of components affected
Corrosion Crack	occurrence*	twenty percent or more of components affected
Closed Corrosion Spall	occurrence*	twenty percent or more of components affected
Open Corrosion Spall	occurrence*	fifteen percent or more of components affected
All Types of Corrosion Defects	occurrence*	twenty percent or more of components affected
Erosion	ten percent or more of components affected	twenty-five percent or more of components affected

*a PI is required if there is at least one occurrence of the defect

EXHIBIT D

DATE: 22Sep97 PAGE NO.: 2

INSPECTOR: M. Delaney BENTS: 120-124.1



NOT TO SCALE

MASTER SKETCH
INSPECTION UNIT 38J
BERTH(S) 57-60/R
FIGURE 38J-2/3

600-29\Prorgam Manual\Dec1999Ver\Figures\38J-2.dwg

EXHIBIT D

REGULAR UNDERWATER INSPECTION FIELD FORM

RETAINING STRUCTURE

BERTH NO(S): 57-60/R **BENT NOS:** 116-127 **INSPECTION UNIT:** 38J

INSP. REQUEST DATE: 9/22/97 **INSPECTOR:** M. Delaney **PAGE** 1 **OF** 2

COMPONENT ID / DEFECT	LOCATION OF COMPONENT DEFECT	SIZE OF COMPONENT DEFECT	INCLUDED IN PI EVALUATION (YES/NO)
RS-116/117 / Erosion	Void in concrete sheet piles due to erosion (i.e. between Bents 114.2/116).	A: 1.33 ft^2 D: 3.0 ft M: 4.0 ft	Yes
RS-116/117 / Erosion	Void in concrete sheet piles due to erosion (i.e. between Bents 114.2/116).	A: 1.33 ft^2 D: 3.0 ft M: 4.0 ft	Yes
RS-116/117 / Erosion	Void in concrete sheet piles due to erosion.	A: 1.33 ft^2 D: 5.0 ft M: 5.0 ft	Yes
RS-116/117 / Erosion	Void in concrete sheet piles due to erosion. 1 rebar exposed.	A: 1.33 ft^2 D: 2.0 in. M: 4.0 ft	Yes
RS-117/118 / Erosion	Void in concrete sheet piles due to erosion.	A: 0.5 ft^2 D: 3.0 ft M: 3.0 ft	Yes
RS-118/119 / Erosion	Void in concrete sheet piles due to erosion. 2 rebars exposed.	A: 2.0 ft^2 D: 2.0 ft M: 4.0 ft	Yes
RS-119/120 / Erosion	Void in concrete sheet piles due to erosion.	A: 3.0 ft^2 D: 2.0 ft M: 6.0 ft	Yes
RS-119/120 / Erosion	Void in concrete sheet piles due to erosion.	A: 3.0 ft^2 D: 2.0 ft M: 6.0 ft	Yes
RS-120/121 / Erosion	Void in concrete sheet piles due to erosion.	A: 2.0 ft^2 D: 4.0 ft M: 4.0 ft	Yes

NOTE: PRINCIPAL INSPECTION IS REQUIRED IF THE FOLLOWING CONDITIONS ARE ENCOUNTERED DURING REGULAR UNDERWATER INSPECTION:

a) Occurrence of breakage or overstressing crack.
b) Corrosion cracks, closed corrosion spalls, or open corrosion spalls, or a combination thereof on 20 percent or more of inspected components or on at least 3 components.
c) Erosion on 25 percent or more of inspected components.
d) Underwater cracks on 20 percent or more of inspected components or on at least 3 components.
e) Settlement of 3" or greater of inspected components.

EXHIBIT D

REGULAR UNDERWATER INSPECTION FIELD FORM

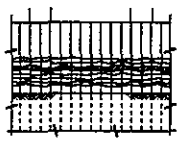
RETAINING STRUCTURE

BREAKAGE - GRAVITY WALL

ELEVATION

MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE VERTICAL DEFLECTIONS.

BREAKAGE - SHEET PILING



ELEVATION

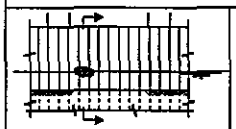
MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE LATERAL DEFLECTIONS.

BREAKAGE - CURTAIN WALL

ELEVATION

MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE LATERAL DEFLECTIONS.

MECHANICAL DAMAGE

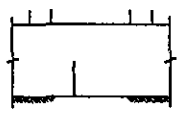


ELEVATION

SECTION

RECESS IN CONCRETE COVER CAUSED BY IMPACT OR CONTINUOUS FRICTION, WITH NO EXPOSED PRESTRESSING STRANDS OR REINFORCING STEEL.

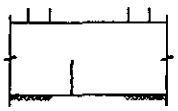
OVERSTRESSING CRACK



ELEVATION

CRACK RESULTING FROM HIGH INTERNAL STRESSES THAT EXCEED STRENGTH OF CONCRETE. OVERSTRESSING CRACKS GENERALLY TEND TO BE CROSS. (NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE)

GENERAL CRACK



ELEVATION

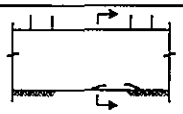
ANY CRACK NOT RESULTING FROM OVERSTRESSING OR CORROSION. APPEARANCE, LOCATION, AND ORIENTATION ARE VARIABLE.

CORROSION CRACK

ELEVATION

SPLITTING CRACK RESULTING FROM EXPANSION OF CHEMICAL PRODUCTS GENERATED BY CORROSION OF PRESTRESSING STRANDS OR REINFORCING STEEL. CRACKS ARE GENERALLY ORIENTED ALONG PRESTRESSING STRANDS OR REINFORCING BARS. RED, ORANGE, OR BROWN CORROSION PRODUCTS MAY BE OBSERVED LEACHING FROM CRACK.

CLOSED CORROSION SPALL

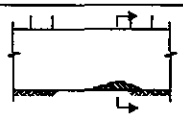


ELEVATION

SECTION

RECESS IN CONCRETE SURFACE CAUSED BY INCOMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. CRACKS ENCIRCLING OR NEARLY ENCIRCLING A FRAGMENT OF CONCRETE INDICATE THAT THE FRAGMENT IS ABOUT TO SPALL OFF.

OPEN CORROSION SPALL

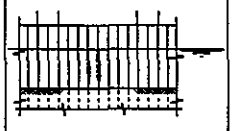


ELEVATION

SECTION

RECESS IN CONCRETE SURFACE CAUSED BY COMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. PRESTRESSING STRAND OR REINFORCING STEEL IS VISIBLE AND MAY BE COVERED WITH CORROSION PRODUCTS.

EROSION



ELEVATION

DETERIORATION OF CONCRETE, GENERALLY RESULTING IN SOFTENING OF THE CONCRETE AND ROUNDING OF CORNERS.

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

REGULAR UNDERWATER INSPECTION WORKSHEET

EXHIBIT D

RETAINING STRUCTURE

BERTH NUMBER(S): 57-60/R **BENT NOS:** 116-127 **INSPECTION UNIT:** 38J

INSP. REQUEST DATE: 9/22/97 **INSPECTOR:** M. Delaney **PAGE** 1 **OF** 1

FIELD DATA			PRINCIPAL INSPECTION REQUIREMENT								
			GENERAL							LOCAL	
			INSPECTION UNIT			LIMITED AREA					
DEFECT TYPE	LOCATION OF AFFECTED COMPONENTS	COMMENTS	NUMBER OF COMPONENTS INSPECTED		PERCENT AFFECTED	NUMBER OF COMPONENTS INSPECTED		PERCENT AFFECTED	CRITERIA	CHECK IF SIGNIFICANT LOCALIZED DEFECT(S)	YES / NO
			AFFECTED	TOTAL		AFFECTED	TOTAL				
1	2	3	4	5	6	7	8	9	10	11	12
Breakage									Occurrence *		
Overstressing Crack									Occurrence *		
General Crack									----- (1)		
Underwater Crack									20% or more of components affected		
Corrosion Crack									20% or more of components affected		
Closed Corrosion Spall									20% or more of components affected		
Open Corrosion Spall									15% or more of components affected		
All Types of Corrosion Defects									20% or more of components affected		
Mechanical Damage									----- (1)		
Settlement									3" or more		
Erosion	116/117, 117/118	A	11	11	100%				20% or more of components affected		Yes

COMMENTS	A: 118/119, 119/120, 120/121, 122/123, 123/124, 124/125, 125/126, 126/127, 121/122

(1) THIS DEFECT WILL GENERALLY NOT REQUIRE A PRINCIPAL INSPECTION.
* A PI IS REQUIRED IF THERE IS AT LEAST ONE OCCURRENCE OF THIS DEFECT.

a) **Breakage:** Maximum dimension and depth should be measured and recorded along with the location. In addition, any broken or exposed reinforcing bars should be identified, and their condition should be recorded. The cause of the breakage should also be recorded, if it is known.

b) **Overstressing** Crack: Location, length, and orientation should be recorded. In addition, each crack should have its maximum width estimated or *measured* using a crack comparator, and recorded. The cause of the crack should be identified, if possible.

c) **Corrosion Crack:** Location, length, and orientation should be noted. In addition, the width of the cracks should be *estimated* and recorded. On non-prestressed components, at a representative number of cracks with a width of 0.25 in. or larger, the concrete cover should be removed, the reinforcing bars should be cleaned, and their remaining diameters recorded.

d) **Closed Corrosion Spall:** Location, area, and maximum dimension should be recorded. This should include all areas of drummy concrete. On non-prestressed components, at a representative number of spalls with a crack width of 0.25 in. and larger, the concrete cover should be removed, the exposed reinforcing bars cleaned, and their remaining diameters measured.

e) **Open Corrosion Spall:** Location, area, depth, and maximum dimension should be recorded. In addition, as discussed in Section 8, the number of exposed reinforcing bars or strands should be counted, a representative sample of bars should be cleaned, and their remaining diameters recorded. On prestressed retaining structures, corrosion defects rarely develop into open spalls because the strand is usually completely corroded at the stage of initial cracking of the concrete cover. Removing the concrete would most likely reveal a severely corroded strand(s), with the remaining wires firmly embedded in the concrete, as shown in Figure 8-6. For PIs, it is recommended that the concrete around the remaining portion of strand not be removed, because this will accelerate the corrosion. However, removal of the concrete cover may be required for a Special Inspection.

f) **Settlement:** The settlement should be measured with a tape measure at two locations in each bay: at the upper left and upper right corners, as discussed in Section 14.5.1b below. The condition of the concrete ratproofing and slope at locations where settlement is measured should be noted. Furthermore, the top of deck surface should be checked for any signs of settlement, including sinkholes, and this information should be correlated with data obtained from below the deck. As described in Section 5.10, the settlement of retaining structures are recorded during PIs regardless of their magnitude. The priority of repairs assigned to them is "IN," as discussed in Section 5.3. No records for estimated repairs are required.

g) **Erosion:** Location, area, depth and maximum dimension should be recorded. If the erosion is on the edges of sheet piling and a void is present behind the sheets, the depth should indicate the distance of horizontal penetration from the exposed face of the sheet piling.

14.5.1 Above Water Principal Inspection

a) **Scope Overview**

A Principal Inspection of a retaining structure includes an inspection of the defect types and their locations identified in the Summary of Regular Above Water Inspection form. In general, the PI covers the entire structure, but may be limited to specific locations where the defects were found, as identified in the Summary of RAWI form. It should determine the location and size of all defect larger than those indicated in Table 5-1. Settlements are recorded regardless of their measured values. All the information should be entered into the ADC or on the Principal Inspection Field Forms for Retaining Structure. In addition, a Summary Report of the PI should be prepared.

b) **Procedures**

An AWPI of a retaining structure should be conducted according to the general guidelines outlined in Section 8. The inspection should be conducted when the water level is at or near low tide, to insure that the exposed portions of the retaining structure are visible. The inspection should be conducted by walking along the concrete ratproofing, or top of slope where there is no ratproofing, and recording the size and location of each defect. Unlike the RAWI, where all component types require inspection, the use of a boat may not be efficient because the scope of work may include only the retaining structure. Thus, walking along the

ratproofing may be more efficient. This will permit close-up examination of each defect.

Areas in the vicinity of closed corrosion spalls should be sounded with an inspection hammer to clearly define their extent, including determination of whether they contain any drummy concrete. The extent of closed corrosion spalls, including drummy concrete characterized by delaminations, can be identified by listening to the sound of the hammer hitting the concrete. A "ping" is characteristic of sound concrete, whereas a hollow sounding "puck" indicates the presence of delaminations. Drummy concrete should be identified as a closed corrosion spall.

Although the inspection concentrates on the types of defects identified in the Summary of Regular Above Water Inspection form, Inspectors should note any other defects which are larger than those indicated in Table 5-1. An illustration of the method for identifying the defect locations and sizes is provided on the reverse side of the field form.

c) Defect Location and Size

The location of a defect on retaining structure is recorded as a quadrant.

The position parameter is not used for location of defects on retaining structure. The combination of two parameters (quadrant and size of defect) is sufficient both to locate the defect on the retaining structure and to provide a unique description.

The crack orientation on retaining structures is determined and recorded as described in Section 8.4.7.

The following are the basic guidelines for identifying the locations of defects on retaining structures:

- All locations are described assuming the Inspector is facing the shore.
- Each section of retaining structure between two adjacent bents is divided into four quadrants, which are identified as upper right (UR), lower right (LR), upper left (UL), and lower left (LL). The quadrants are used for recording the locations of all types of defects except for settlement.
- The four corners of the outboard face of the retaining structure between two adjacent bents are identified as upper right (UR), lower right (LR), upper left (UL) and lower left (LL). The two upper corners are used for recording the location of settlement.
- A special note should be made in the comment field for defects extending end-to-end through the retaining structure component (in either direction). A note should also be made for defects (typically overstressing cracks) which extend from the retaining structure onto the adjacent pile caps, beams and deck slabs.

The sketches on the reverse side of the Principal Inspection Field Form for Retaining Structure show examples for identifying the location and size of each defect type described in Section 14.1. The parameters used to describe the size of each defect are identified in Section 4.

All parameters and their abbreviations used for recording defects on retaining structures are listed in the upper left corner on the reverse side of the Principal Inspection Field Form for Retaining Structures. The basic rules for identifying the location of defects on retaining structures are illustrated in the upper middle portion of the same sheet.

d) Recording Findings

Inspection findings should be entered directly into the ADC as described in Section 8. Alternatively, paper forms (Principal Inspection Field Form) may be used, with the data entered into AIRIS later at the office. A sample Principal Inspection Field Form for above water retaining structure, with typical data entered, is provided on the following page. Copies of the blank forms are available in the Appendix.

The results of the PI of retaining structure should be included in the Summary Report of the Above Water Principal Inspection as described in Section 8.6.

Notification of any Emergency Conditions observed should be made according to Section 8.9 as necessary.

EXHIBIT D

PRINCIPAL INSPECTION FIELD FORM

RETAINING STRUCTURE ABOVE WATER

BERTH NOS: 400-430 **INSP. REQUEST DATE:** 12/21/99 **INSPECTION UNIT:** 287

BENT NOS: 58-78 **DATE OF INSPECTION:** 12/31/99 **INSPECTOR:** J. JORGES

COMPONENT ID / DEFECT TYPE	EXISTING DEFECT: LOCATION	SIZE	PREV. REPAIR	REPAIR PRIORITY	PS	UW	COMMENT	ESTIMATED REPAIR PARAMETERS: GENERAL REPAIR TYPE (GRT)	SIZE OF REPAIR	SPECIFIED REPAIR METHOD (SRM)
RS-420/421 BREAKAGE	Q: LL, LR	M: 5.6 D: 48.0		IN			Complete breakage of wall. Rebars are broken. Section of wall missing.	TBD		
RS-411/412 CORROSION CRACK	Q: LL, LR O: LONG	L: 3.5 w: 0.25		MT			Corrosion products leaching from crack.	AR	A: 5.0 D: 5.0	TR (Trowel)
RS-405/406 SETTLEMENT	C: UL	t: 6.0		IN			Measured down from pile cap soffit. No overstressing cracks.	TBD		

NOTES:

Prev. Repairs - Check "X" if defect was previously repaired

Repair Priority - Check "EM" - Emergency, "PR" - Priority, "MT" - Maintenance, "IN" - To Be Investigated

PS - Check "X" if defect may cause damage to prestressing reinforcement

UW - Check "X" if defect is underwater or below EL +3.0 ft

EXHIBIT D

RETAINING STRUCTURE ABOVE WATER

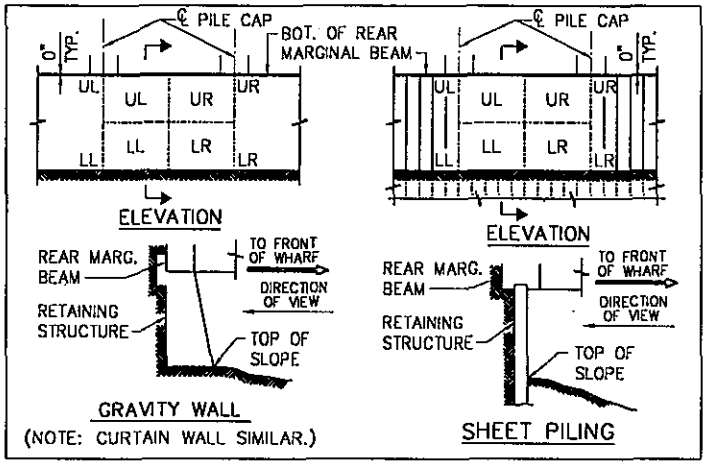
Q - QUADRANTS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- ⊠ = LOWER LEFT
- DEFECT APPEARS IN ALL QUADRANTS

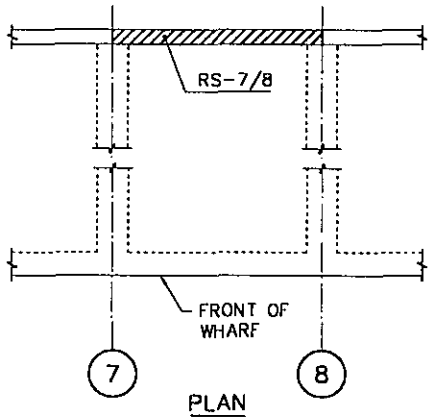
C - CORNERS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT

O - CRACK ORIENTATION
- LONG - LONGITUDINAL
- CROSS - CROSS
- DIAG - DIAGONAL

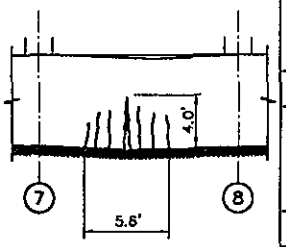
- A - AREA (SF)
- L - LENGTH (FT)
- D - DEPTH (IN.)
- M - MAX. DIMENSION (FT)
- W - CRACK WIDTH AND EST. WIDTH OF REPAIR (IN.)
- N - NUMBER OF EXPOSED REBARS
- T - SETTLEMENT (IN.)

GRT - GENERAL REPAIR TYPE
- LN - LINEAL
- AR - AREAL
- EN - ENCASEMENT
- TBD - TO BE DETERMINED





BREAKAGE - GRAVITY WALL

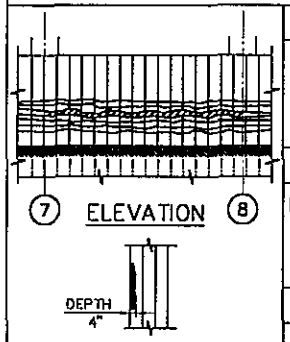


LOCATION: Q: LL,LR

INSP. SIZE	EST. SIZE
M: 5.6 D: 48	

COMMENT: REBARS BROKEN ENGR. INVESTIGATION REQ'D.

BREAKAGE - SHEET PILING

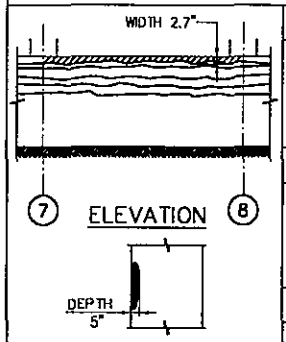


LOCATION: Q: LL,LR

INSP. SIZE	EST. SIZE
M: 15.0 D: 4.0	R: AR A: 40.0 D: 5.0

COMMENT: CONTINUOUS THROUGH RS-7/8

BREAKAGE - CURTAIN WALL

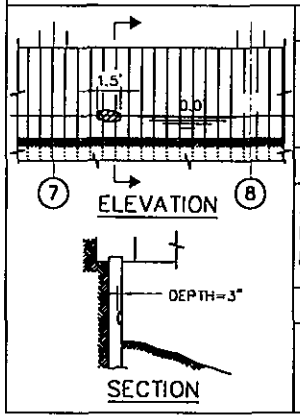


LOCATION: Q: LL,LR

INSP. SIZE	EST. SIZE
M: 15.0 D: 5.0	R: AR A: 50.0 D: 7.0

COMMENT: CONTINUOUS THROUGH RS-7/8

MECHANICAL DAMAGE

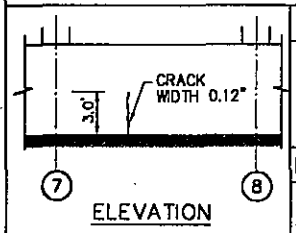


LOCATION: Q: LL

INSP. SIZE	EST. SIZE
A: 3.0 D: 3.0 M: 1.5	GRT: AR A: 4.0 D: 4.0

COMMENT:

GENERAL/OVERSTR. CRACK



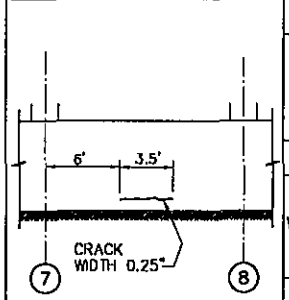
NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE

LOCATION: Q: LL, O: CROSS

INSP. SIZE	EST. SIZE
L: 3.0 W: 0.12	GRT: LN L: 4.0 W: 5.0

COMMENT: VERTICAL OVERSTR.

CORROSION CRACK

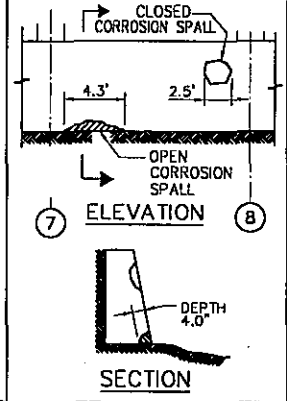


LOCATION: Q: LL,LR, O: LONG

INSP. SIZE	EST. SIZE
L: 3.5 W: 0.25	GRT: AR A: 5.0 D: 4.0

COMMENT:

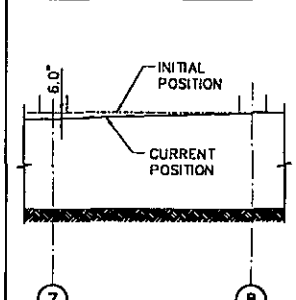
CORROSION SPALL



LOCATION: (OPEN) Q: LL; (CLOSED) Q: UR

INSP. SIZE	EST. SIZE
(OPEN) A: 7.5 M: 4.3 D: 4.0 N: 4 (CLOSED) A: 3.6 M: 2.5	(OPEN) GRT: AR A: 10.0 D: 5.0 (CLOSED) GRT: AR A: 5.0 D: 4.5

SETTLEMENT



LOCATION: C: UL

INSP. SIZE	EST. SIZE
T: 6.0	

COMMENT:

14.5.2 Underwater Principal Inspection

a) Scope Overview

The scope of the Underwater Principal Inspection of retaining structures involves inspecting for the types of defects and at the location(s) itemized in the Summary of Underwater Inspection form, as discussed in Section 7.6.2.

All retaining structure components within the range of bent numbers indicated in the Summary of RAWI form should be inspected for the defect types identified therein. The PI is performed to determine the location and size of each defect exceeding the recording criteria indicated in Table 5-1. All the information should be entered into the ADC or on the Principal Inspection Field Form for underwater retaining structures. In addition a Summary Report of the results of the PI should be prepared.

b) Procedures

The Underwater Principal Inspection of retaining structures should be performed in accordance with the general guidelines presented in Section 8. The procures to be used during the UWPI may vary greatly with the type of repairs anticipated, as discussed in Sections 8.1 and 11.5.2b.

The scope of the UWPI should be customized as appropriate to the repair methods contemplated. In some cases, the nature of the damage may dictate inspection below the mudline. Such special cases would require excavation to pre-determined limits.

c) Defect Location and Size

Documentation of each defect's location and size should follow the same guidelines as for Above Water Principal Inspections.

d) Recording Findings

Inspection findings should be entered directly into the ADC device as described in Section 8. Alternatively, paper forms (Principal Inspection Field Form) may be used, with the data entered into AIRIS later at the office. The same form should be used for both prestressed and non-prestressed piles.

A sample form, with typical data entered, is provided on the following page. Copies of the blank forms are provided in the Appendix. The results of the UWPI of retaining structures should be included in the Underwater Principal Inspection Summary Report as described in Section 8.6.

Notification of any Emergency Conditions observed should be made according to Section 8.9 as necessary.

EXHIBIT D

PRINCIPAL INSPECTION FIELD FORM

RETAINING STRUCTURE UNDER WATER

BERTH NOS: 420-430 **INSP. REQUEST DATE:** 12/13/99 **INSPECTION UNIT:** 316

BENT NOS: 156-180 **DATE OF INSPECTION:** 1/15/00 **INSPECTOR:** J. JURIS

COMPONENT ID / DEFECT TYPE	EXISTING DEFECT: LOCATION	SIZE	PREV. REPAIR	REPAIR PRIORITY	PS	UW	COMMENT	ESTIMATED REPAIR PARAMETERS: GENERAL REPAIR TYPE (GRT)	SIZE OF REPAIR	SPECIFIED REPAIR METHOD (SRM)
RS-425/426 BREAKAGE	Q: LL, LR	M: 150 D: 12.0		EM		X	Two sheet piles are broken. Major loss of fill. Large sinkhole.	REP	A: 20.0 D: 12.0	REP (Replacement)
RS-428/429 MECHANICAL DAMAGE	Q: LL	A: 3.0 D: 3.0 M: 1.5		MT		X	Impact damage on two adjacent sheet piles. No rebars exposed.	AR	A: 4.0 D: 4.0	TR (Trowel)
RS-429/430 EROSION	Q: LL, LR	A: 20.0 M: 10.0 D: 3.0		MT		X	Continuous area of reduced cover just below MLLW.	TBD		

NOTES:

Prev. Repairs - Check "X" if defect was previously repaired

Repair Priority - Check "EM" - Emergency, "PR" - Priority, "MT" - Maintenance, "IN" - To Be Investigated

PS - Check "X" if defect may cause damage to prestressing reinforcement

UW - Check "X" if defect is underwater or below EL +3.0 ft

EXHIBIT D

RETAINING STRUCTURE UNDERWATER

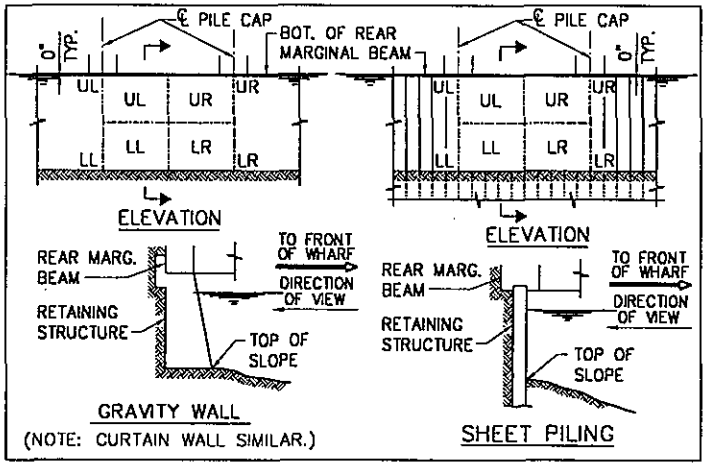
Q - QUADRANTS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT
- XX - DEFECT APPEARS IN ALL QUADRANTS

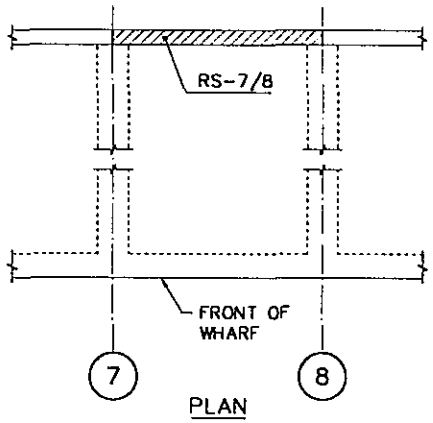
C - CORNERS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT

O - CRACK ORIENTATION
- LONG - LONGITUDINAL
- CROSS - CROSS
- DIAG - DIAGONAL

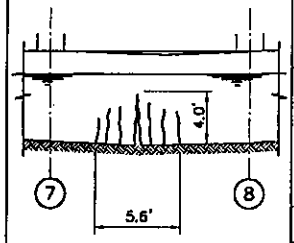
- A - AREA (SF)
- L - LENGTH (FT)
- D - DEPTH (IN.)
- M - MAX. DIMENSION (FT)
- W - CRACK WIDTH AND EST. WIDTH OF REPAIR (IN.)
- N - NUMBER OF EXPOSED REBARS
- T - SETTLEMENT (IN.)

GRT - GENERAL REPAIR TYPE
- LN - LINEAL
- AR - AREAL
- EN - ENCASEMENT
- TBD - TO BE DETERMINED



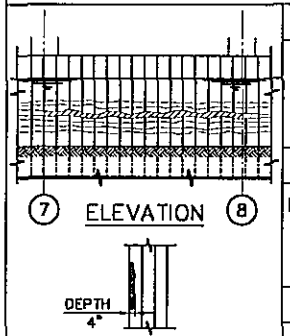


BREAKAGE - GRAVITY WALL



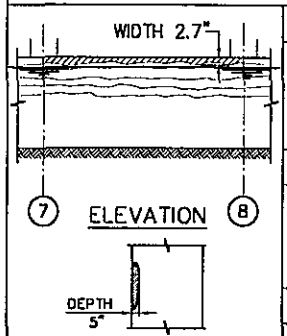
LOCATION	
Q: LL,LR	
INSP. SIZE	EST. SIZE
M: 5.6 D: 48	
COMMENT	
REBARS BROKEN ENGR. INVESTI-GATION REQ'D.	

BREAKAGE - SHEET PILING



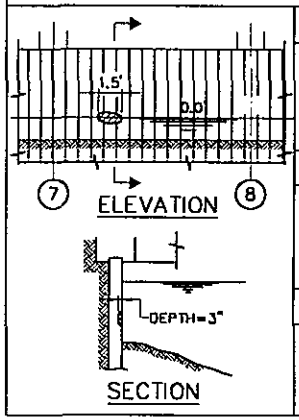
LOCATION	
Q: LL,LR	
INSP. SIZE	EST. SIZE
M: 15.0 D: 4.0	R: AR A: 40.0 D: 5.0
COMMENT	
CONTINUOUS THROUGH RS-7/8	

BREAKAGE - CURTAIN WALL



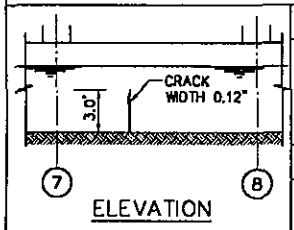
LOCATION	
Q: LL,LR	
INSP. SIZE	EST. SIZE
M: 15.0 D: 5.0	R: AR A: 50.0 D: 7.0
COMMENT	
CONTINUOUS THROUGH RS-7/8	

MECHANICAL DAMAGE



LOCATION	
Q: LL	
INSP. SIZE	EST. SIZE
A: 3.0 D: 3.0 M: 1.5	GRT: AR A: 4.0 D: 4.0
COMMENT	

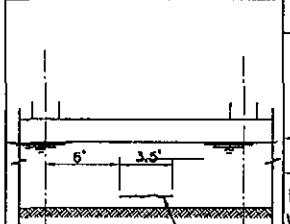
GENERAL/OVERSTR. CRACK



NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE

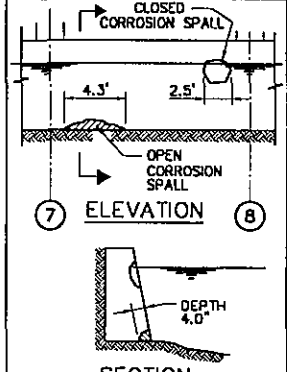
LOCATION	
Q: LL O: CROSS	
INSP. SIZE	EST. SIZE
L: 3.0 W: 0.12	GRT: LN L: 4.0 W: 5.0
COMMENT	
VERTICAL OVERSTR.	

CORROSION CRACK



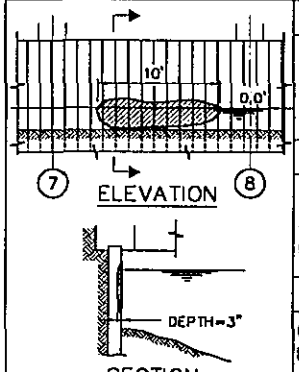
LOCATION	
Q: LL,LR O: LONG	
INSP. SIZE	EST. SIZE
L: 3.5 W: 0.25	GRT: AR A: 5.0 D: 4.0
COMMENT	

CORROSION SPALL



LOCATION		
(OPEN) Q: LL		(CLOSED) Q: UR
INSP. SIZE		EST. SIZE
(OPEN) A: 7.5 M: 4.3 D: 4.0 N: 4 (CLOSED) A: 3.6 M: 2.5		(OPEN) GRT: AR A: 10.0 D: 5.0 (CLOSED) GRT: AR A: 5.0 D: 4.5

EROSION



LOCATION	
Q: LL, LR	
INSP. SIZE	EST. SIZE
A: 20.0 M: 10.0 D: 3.0	GRT: AR A: 25.0 D: 3.0
COMMENT	
CONTINUOUS LOSS OF CONCRETE COVER	

SECTION 11

TABLE OF CONTENTS

LIST OF TABLES

11. INSPECTION OF PILES

There are several types of concrete piles supporting POLA's waterfront structures. The older structures, built before 1955, are supported primarily by non-prestressed concrete piles, 16 in. to 22 in. square. The piles on some of these structures have asphalt-impregnated shells, as illustrated by Photos 11-1 and 11-2, which increased their durability significantly. Tapered square, solid round, and cylindrical piles are also characteristic of the older construction. Since 1957, structures within the Port were built almost exclusively on octagonal prestressed piles. The first wharves of this type utilized 16 in. piles. In the 1960s and 1970s, 18 in. piles were used, and the newest wharves are supported by 24 in. piles, which are shown in Photo 11-3.

11.1 TYPICAL DEFECTS

Breakage is most common on the first row of piles, which are the most vulnerable to vessel impact, as illustrated by Photos 11-4, 11-5, and 11-6. Breakage is generally found at three locations:

- the point of vessel contact
- the pile/cap connection
- at a point, usually 3 ft to 7 ft, below the mudline

Mechanical damage usually occurs within the tidal zone. Pile corners are the most typical location for this defect, as shown in Photo 11-7. The most extensive defects are usually found on piles located at the outboard corners of the wharf. Mechanical damage also occurs where piles were used for securing mooring lines, either during construction or berthing operations. Extensive mechanical damage which results in reinforcing steel exposure eventually becomes an open corrosion spall.

Overstressing cracks most frequently occur for the same reasons and at the same locations as breakage. Photos 11-8 and 11-9 illustrate two examples of overstressing cracks. Overstressing cracks on piles are usually cross cracks; however, they may also occur as diagonal shear cracks.

General cracks occur infrequently and at random locations, but only above water.

Corrosion cracks are the most typical defect on marine concrete piles. They are caused by the expansion of corrosion products on reinforcing steel, usually at the corners of the pile. Corrosion cracks on piles usually start above MLLW and extend up to the pile/cap connection. Large cracks may propagate down into the tidal zone, as shown in Photo 11-10, but will often stop at MLLW, since corrosion below the waterline occurs much more slowly due to the lack of oxygen. "Double" corrosion cracks, as described in Section 4.7.2, are very typical.

On concrete wharves, the piles in the back rows are frequently more affected by corrosion than the piles in the front rows. This occurs due to the more extensive spray action caused by standing waves reflected from the retaining structure.

Corrosion cracks occur on both non-prestressed and prestressed piles. When corrosion cracks are observed on prestressed piles, the structural consequences may be significant. A discussion of the structural consequences associated with corrosion cracks on non-prestressed versus prestressed piles was presented in Section 4.6.5. As stated therein, a typical corrosion crack in the vicinity of a prestressing strand corresponds to very significant, or even complete, loss of the strand's original cross-sectional area. Photos 11-11 and 11-12 show a corrosion crack on a prestressed pile and the exposed strand following the removal of the concrete cover, respectively. The virtually complete corrosion loss of the strand is evident in Photo 11-12.

Corrosion spalls, in their "classic" form, i.e., lens-like fragments of concrete cover, are rarely found on concrete piles. Spalling of the concrete cover on piles typically occurs at the final stage of the continuous growth of a "double" corrosion crack at the corner. The resulting defect, termed "corner spall", leaves the pile without concrete cover at its corner, and the corner reinforcing bar or strand is consequently exposed, as illustrated by Photo 11-13, left. During subsequent deterioration, the corner spall spreads over the sides of the pile, until all the concrete cover in the tidal zone is gone, and all the reinforcement is exposed, as shown in Photo 11-13, right. Piles can have closed corrosion spalls and/or open corrosion spalls. The difference between the two is described in Section 4. As is the case for corrosion cracks, the structural consequences of corrosion spalls on prestressed piles may be much more severe than for non-prestressed piles. A discussion of this difference is presented in Section 4.6.5.

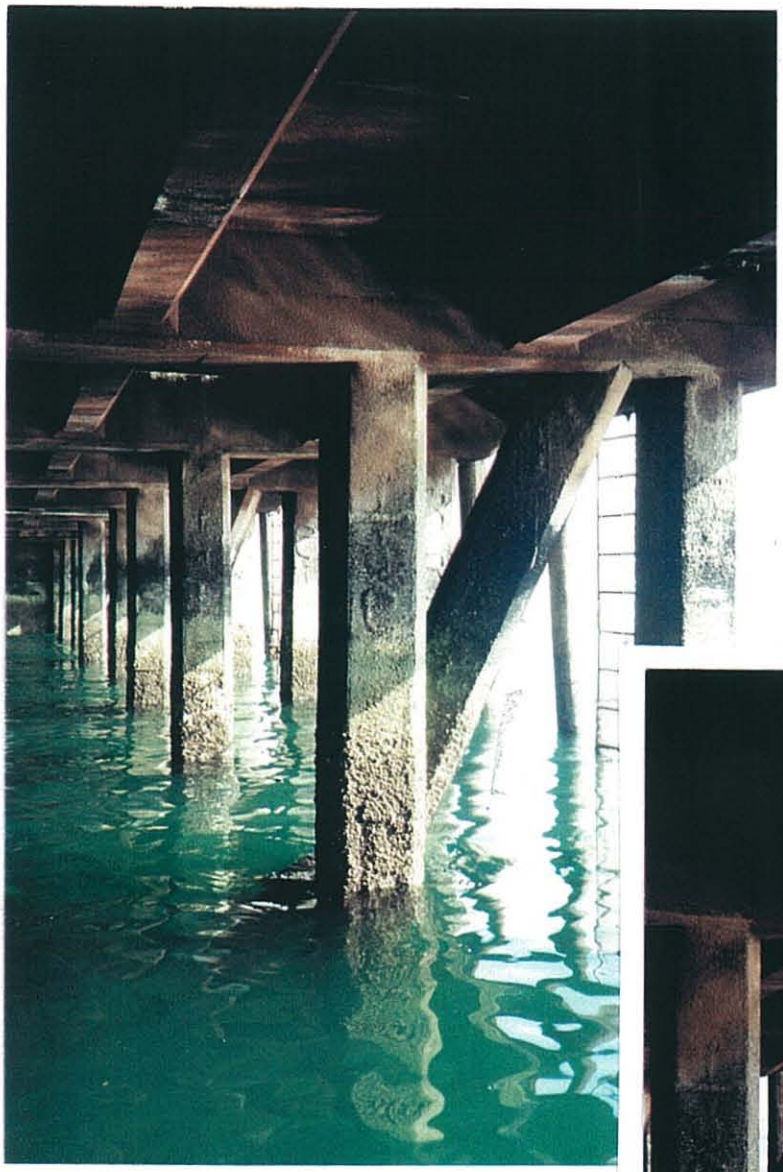


PHOTO 11-1 (left). General view of piles with asphalt-impregnated shells.

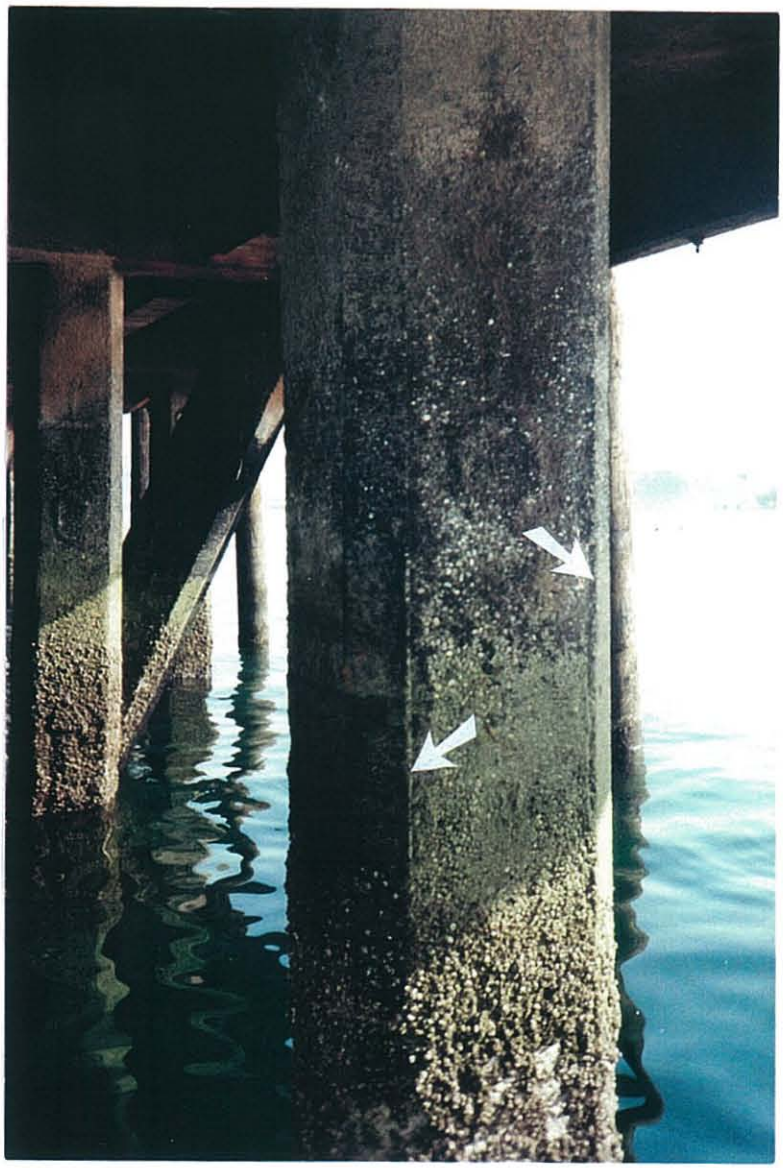


PHOTO 11-2 (right). Close-up of form joints between asphalt-impregnated shells on pile.

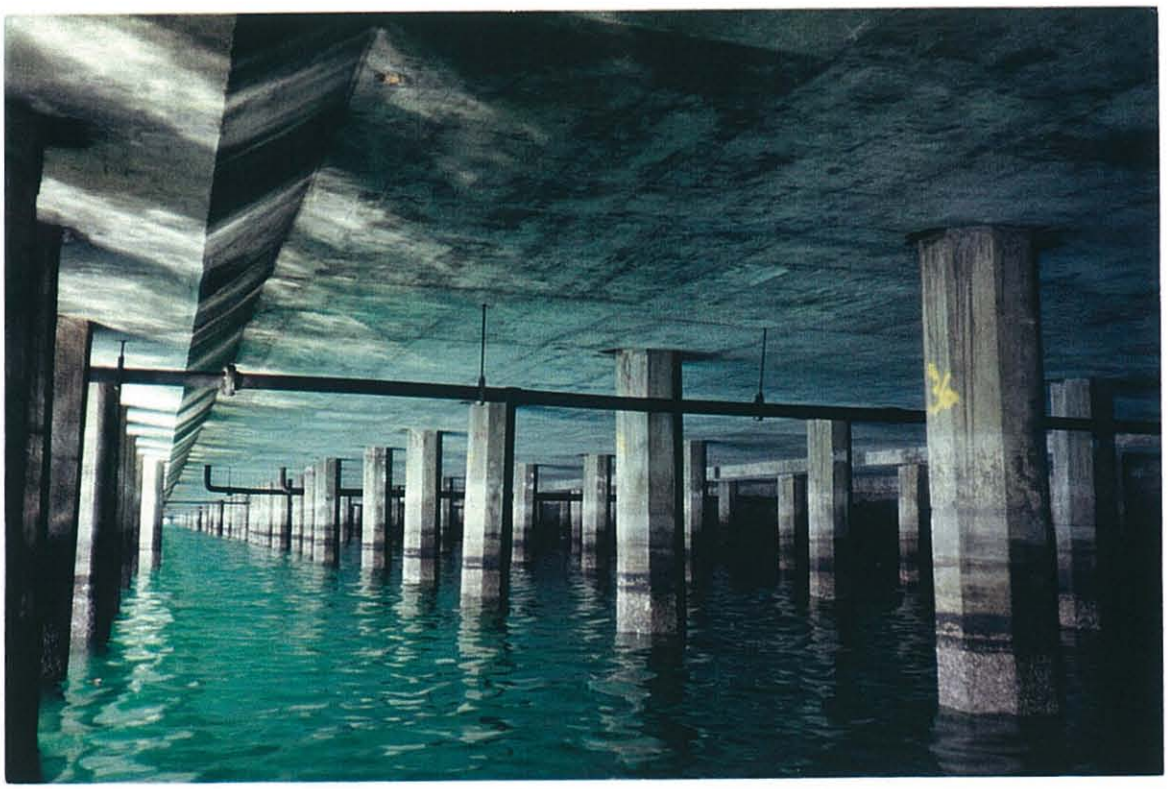


PHOTO 11-3. General view of 24 in. octagonal prestressed piles supporting concrete wharf.

PHOTO 11-4. Breakage of concrete pile immediately below connection with cap.

PHOTO 11-5. Breakage of front row pile due to vessel impact. Breakage is immediately below pile/cap connection (left) and immediately above MHW (right).

PHOTO 11-6 (right). Breakage of pile at corner of berth due to impact, with subsequent corrosion of reinforcing steel.

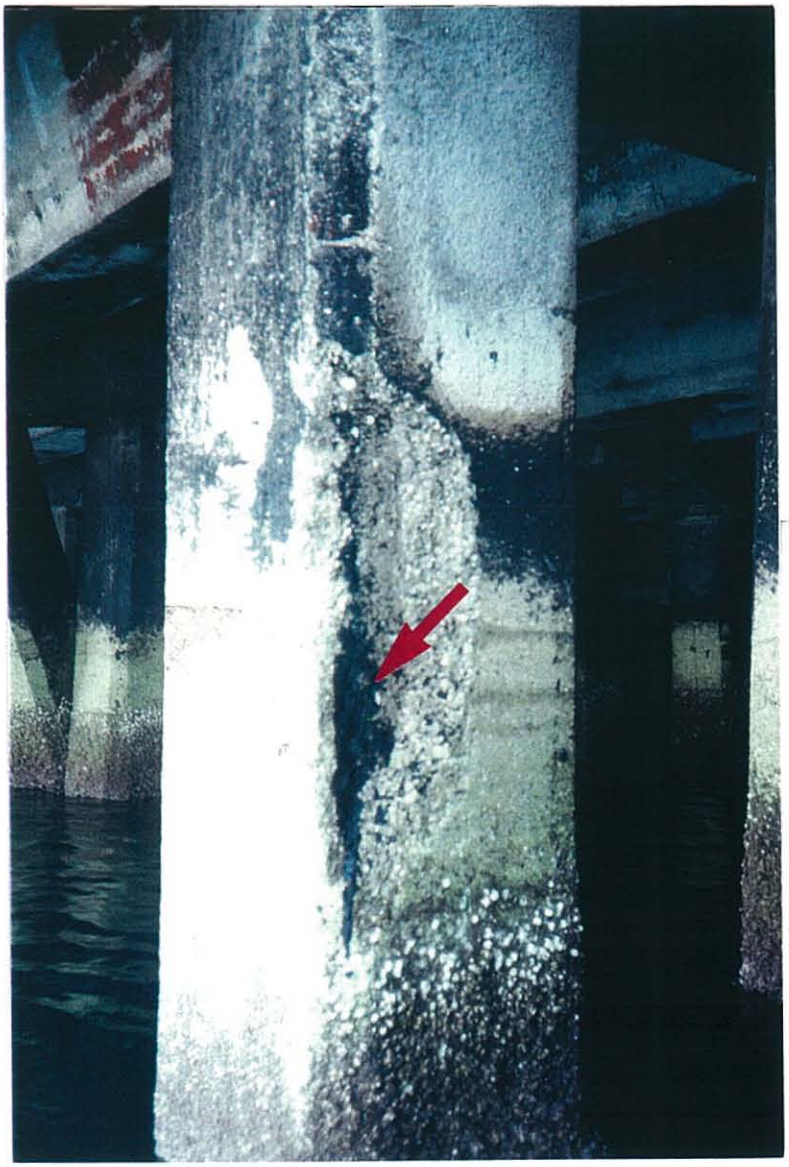


PHOTO 11-7 (left). Mechanical damage of pile corner due to impact.

PHOTO 11-8. Overstressing cracks at top of batter pile, immediately below connection to deck.

PHOTO 11-9. Overstressing crack at top of batter pile, immediately below connection to deck.

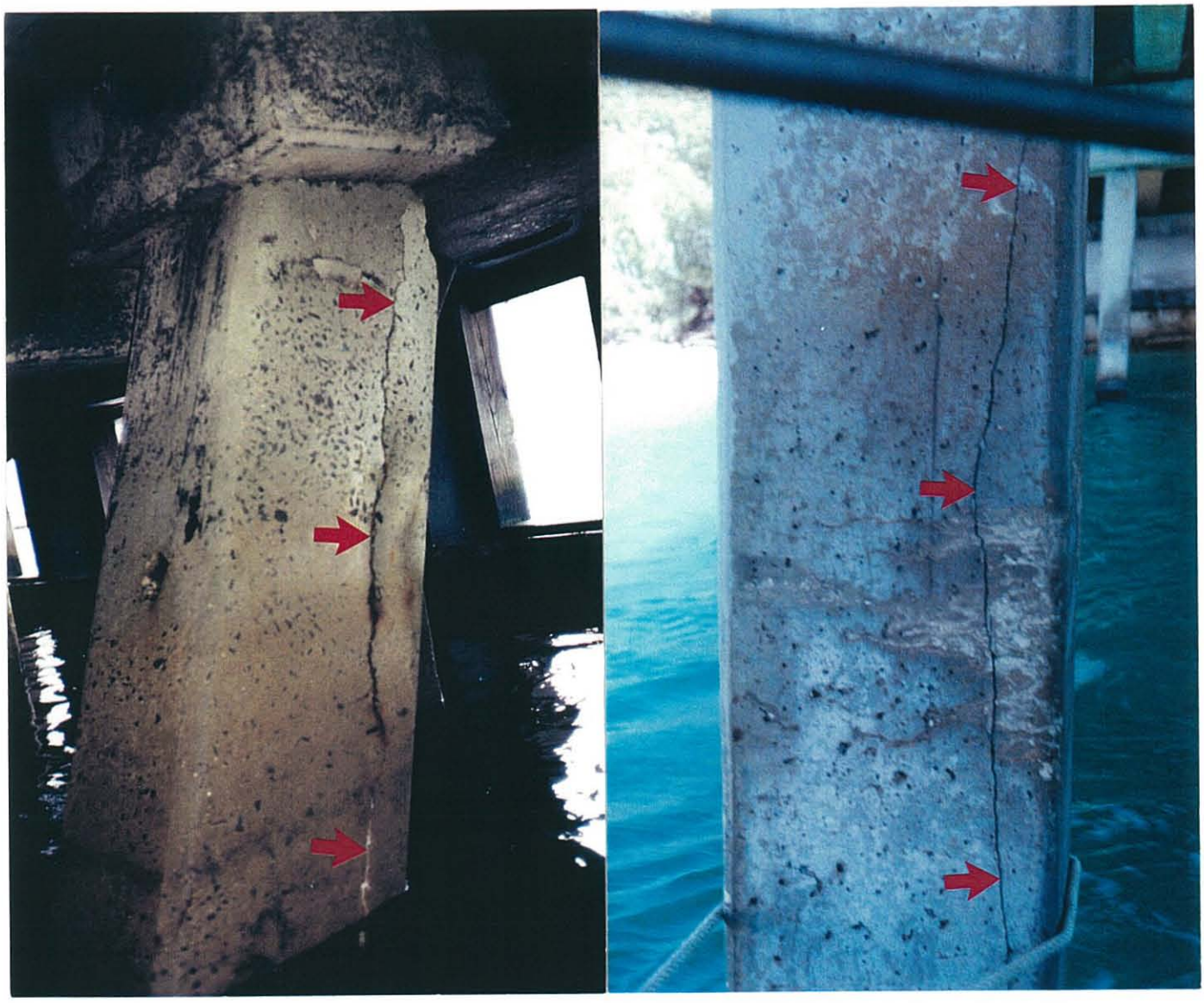


PHOTO 11-10. Corner corrosion cracks: non-prestressed square batter pile (left); prestressed square vertical pile (right).

PHOTO 11-11 (right). Corrosion crack on prestressed pile.

PHOTO 11-12 (left). Close up of corrosion crack shown in Photo 11-11 after removal of concrete cover. The prestressing strand which generated this crack is completely corroded.

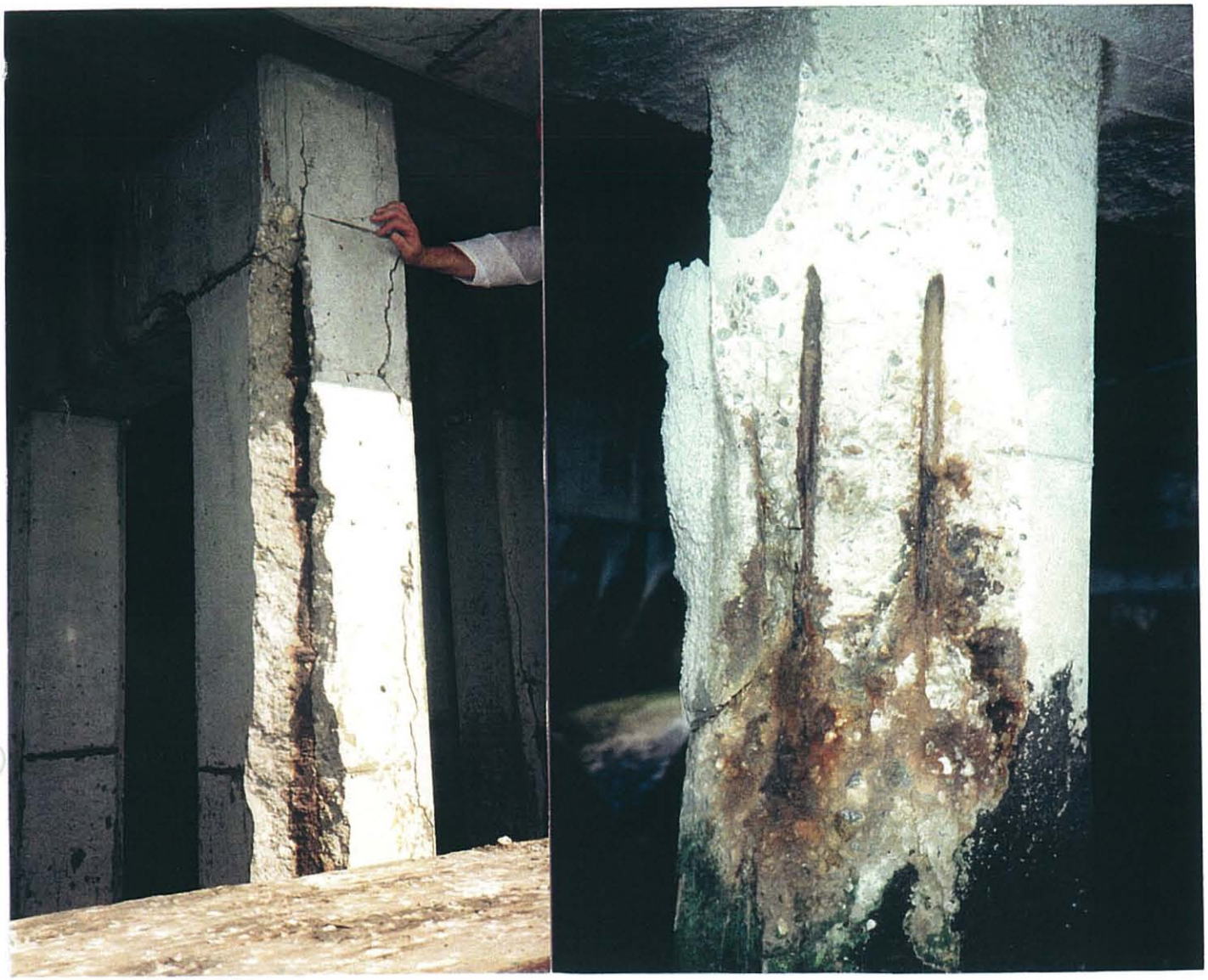


PHOTO 11-13. Open spalls at corners of concrete piles. Left photo shows exposed corner bar, while right photo shows spall spreading over two adjacent sides of pile.

11.2 SPECIAL TYPES OF DEFECTS

11.2.1 Pile/Built-up Cracks

a) Definition

A **pile/built-up crack** is a crack appearing at the interface between the precast pile and the cast-in-place concrete section built on top of the pile, as illustrated in Photo 11-14.

b) Description, Causes, and Location

If and when concrete piles are driven below the design cut-off elevation, they are built up with cast-in-place (CIP) concrete to match the elevation of the bottom of the pile cap. There are a significant number of built-up piles within the Port, many of which exhibit this type of cracking.

Pile/built-up cracks occur as a result of two processes. First, the bond between the precast and CIP concrete is weaker than the concrete itself, and when the CIP concrete shrinks, the bond is often broken. Secondly, the temperature stresses and the differences in the elastic properties of the CIP and precast concrete tend to increase the size of the crack initiated by the shrinkage. As a result of these two processes, a separation crack develops at the pile/built-up interface. This crack may lead to other types of deterioration, including corrosion of the reinforcing steel and subsequent spalling of the concrete cover.

c) Size

Pile/built-up cracks are described by two parameters:

- length
- width

d) Structural Consequences

The pile will function adequately despite the cracks, as long as the reinforcing steel is properly anchored and not corroded. However, the cracks eventually reduce the service life of the pile. Since the crack may lead to corrosion of the reinforcing steel, the effect of the crack on the pile's structural capacity depends on the size and age of the crack. Furthermore, the cracks are located at the head of the pile, which is typically a region of relatively high bending moment, and therefore any reduction in strength is likely to be of significance.

Built-up cracks with a width of 0.01 or more should be recorded (and repaired) on prestressed piles. For non-prestressed piles, built-up cracks with a width of 0.06 in. or more should be recorded and repaired, as discussed in Section 5.

11.2.2 Erosion

a) Definition

Erosion is defined as a general reduction of a pile's cross-sectional area, caused by the deterioration of the outer concrete layer. The definition of erosion as used in this Program includes both external abrasion-related deterioration and internal reaction-related deterioration such as sulfate attack or alkali-silica reaction.

b) Description

The first stage of erosion on square piles is usually observed as "rounding" of the corners, as illustrated in Photo 11-15. This defect may be typical for concrete piles that have been in service for twenty-five years or more. As erosion progresses, the loss of material also occurs on the sides of the piles. In advanced cases, the concrete cover may be completely worn away, exposing the reinforcing steel.

c) Causes and Location

Erosion occurs almost exclusively within the tidal zone and is usually particularly extensive at or slightly above MLLW. It is caused by a wide range of factors, including wave and current action, wetting/drying, chemical deterioration, mechanical abrasion caused by floating debris and sediment transport, and bio-degradation due to marine growth and other organisms. High quality concrete will generally not erode until after fifty to seventy years of service. However, poor quality concrete may erode after as few as seven to ten years of service. Erosion caused by internal reactions such as sulfate attack or alkali-silica reaction may lead to a general softening of the concrete throughout the underwater portions of the piles.

d) Size

Erosion of piles is described by three parameters:

- approximate area of eroded surface
- maximum depth
- maximum dimension of affected zone along the pile

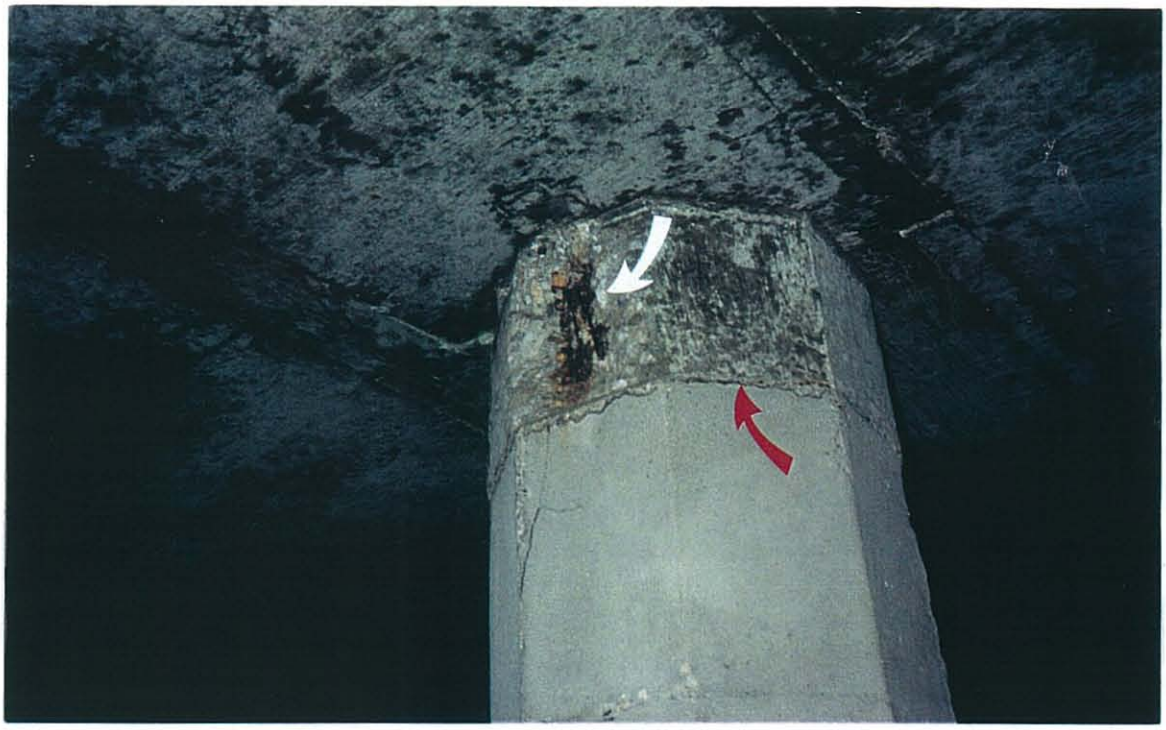


PHOTO 11-14. Built-up cast-in-place (CIP) section on concrete pile. Red arrow indicates typical crack location, while white arrow points to corrosion spall at CIP section.

PHOTO 11-15. Rounding of pile corners due to erosion in tidal zone.

In addition, it is important to note whether there are any exposed reinforcing bars or prestressing strands, and their condition.

e) Structural Consequences

Erosion reduces the pile's cross section and therefore its structural capacity. The pile's durability is particularly affected because the erosion reduces the thickness of the concrete cover at the most vulnerable location, i.e., in the tidal zone. In fact, the erosion of pile corners is merely the first stage in a deterioration process which usually culminates in corrosion of the reinforcing steel.

Erosion should be recorded and repaired on piles if its depth exceeds 1.0 in. on prestressed piles, or 1.5 in. on non-prestressed piles, as discussed in Section 5.

11.2.3 Underwater Cracks

a) Definition

Underwater cracks are a type of pile defect that has been found on concrete piles within the Port, as well as at several marine structures throughout the United States in recent years. The cracks, which are oriented longitudinally, can be either continuous or intermittent. They develop underwater and slowly grow in size. A recent investigation conducted by the Port concluded that the primary cause of the cracking is Delayed Ettringite Formation (DEF) within the concrete.

b) Description

Available information on underwater cracking can be summarized as follows:

- The cracks appear on octagonal and square prestressed piles underwater and typically only the tails of the cracks are observed extending above MLLW.
- Cracks are nearly vertical and typically intermittent when widths are small, but often become continuous from waterline to mudline as crack widths increase. Crack lengths range from 6 ft to 43 ft, with a mean length of 8 ft.
- Observed crack widths range from 0.02 in. to 0.25 in., with a mean width of 0.09 in.
- Most piles have two to four cracks per affected pile but some piles have over 10 cracks observed.
- Cracks develop in service, but no correlation has been established between the degree of cracking and the age of piles. Limited monitoring performed elsewhere so far has indicated that crack widths may increase over time.
- Underwater cracking is widespread within the Port with approximately one out of every four prestressed piles affected.

c) Causes

Available information on the durability of concrete structures in a marine environment indicates that properly manufactured precast concrete piles do not normally experience any significant underwater deterioration throughout their design life. Therefore, the underwater cracking that has been found on wharves within the Port, and on other marine structures in the United States, indicates a deviation from the norm.

The limited information resulting from an investigation performed by POLA indicates that the cause of cracking is a growth of crystals of ettringite inside the concrete. The ettringite is one of the products of hydration of cement, which normally forms to a full extent when the concrete is still plastic. However, under certain conditions, which include chemical composition of cement, (high sulfate/aluminate ratio), microcracking of the concrete (perhaps caused by steam curing temperatures in excess of 160°F, ASR, and/or prestressing forces), and relative humidity in excess of 95% in service, the normal early growth of ettringite crystals may be inhibited. When placed into service in a humid or wet environment, continuation of the process in the hardened concrete causes cracking. It may take a number of years before the potential for the chemical reactions involved will be exhausted, hence the slow growth of cracks observed on piles.

DEF has only recently been recognized by concrete professionals. The first published information in the U.S. was in 1995, and it was associated with concrete rail ties on the East Coast. European countries have studied DEF since the early 1980s.

d) Location

Underwater cracks have been found only on piles at wharves built after 1960. These piles are either octagonal or square in shape, and are prestressed. It

is not known with certainty whether the shape or the prestressing characteristics contribute to the formation of the cracks. The cracks are vertical, and usually appear on the sides of the octagon, as illustrated in Photo 11-16. The larger cracks are continuous from the mudline to MLLW. Some of the smaller and thinner cracks are intermittent and overlapping. In some cases there are cracks on different sides of the same pile, while in other cases several cracks are present on the same side of a pile, as shown in Photo 11-17.

e) **Size**
Underwater cracks are described by two parameters:

- length
- width

Since information on the dynamics and consequences of the underwater cracking is still limited, all cracks, irrespective of their size, should be recorded during Underwater Regular and Principal Inspections.

f) **Structural Consequences**
The available information on the size, location and geometry of underwater cracks shows that the associated structural damage in most cases is relatively minor. The main concern is over potential long-term durability problems. The cracks as observed are generally small and shallow. Only isolated, large cracks extend to the strands. It is very important to know if the observed cracks are as big as they will ever get or, if the process will continue.

Underwater cracks will not significantly reduce a pile's capacity as long as the cracks are shallow and do not expose the prestressing strands. However, if the underwater cracks trigger corrosion of the strands, the situation may become serious. Thorough monitoring of underwater cracks is necessary in order to evaluate their effect on the structural capacity and durability of prestressed piles.

The need and the technical feasibility for repair of damaged piles should be determined on the basis of findings about the dynamics of the deterioration process and the extent of final damage. For example, if the cracks do not provide access to the strands for seawater now, and the potential for their growth is exhausted before the crack reaches the strand, no repairs may be required.

11.3 REGULAR ABOVE WATER INSPECTION

11.3.1 Scope Overview

As described in Section 7.1, the Regular Above Water Inspection (RAWI) of piles involves a visual survey of the piles' condition. All pile defects exceeding in size those indicated in Table 5-1 should be recorded. The findings of the RAWI on piles may determine the need for a PI of the inspection unit. They may also result in other possible recommended actions (Emergency, Special Inspection, etc.). The results of the inspection of piles have a substantial impact on the Overall Repair Priority Rating assigned as a result of a RAWI.

11.3.2 Procedures

The general procedure for executing RAWIs is described in Section 7. The RAWI of piles should be performed from a small boat. Each pile should be checked from the MLLW level to the pile cap or deck soffit for the characteristic defects described in Sections 11.1 and 11.2, and illustrated on the reverse side of the RAWI worksheets.

The most important specific requirement for inspecting piles is that the work be performed during low tide, as this provides the most efficient way to determine the existence and extent of defects, including the above water extension of underwater cracks. As mentioned in Section 11.2.3, underwater cracks may be visible above MLLW, and therefore the lower the water level during the inspection, the greater the chance of determining their existence and extent.

Aside from determining the overall condition of the structure's piles, the number or percentage of affected piles for each type of defect should be determined. In addition, any damage which may require emergency action, and any special or unusual defects, should be identified.

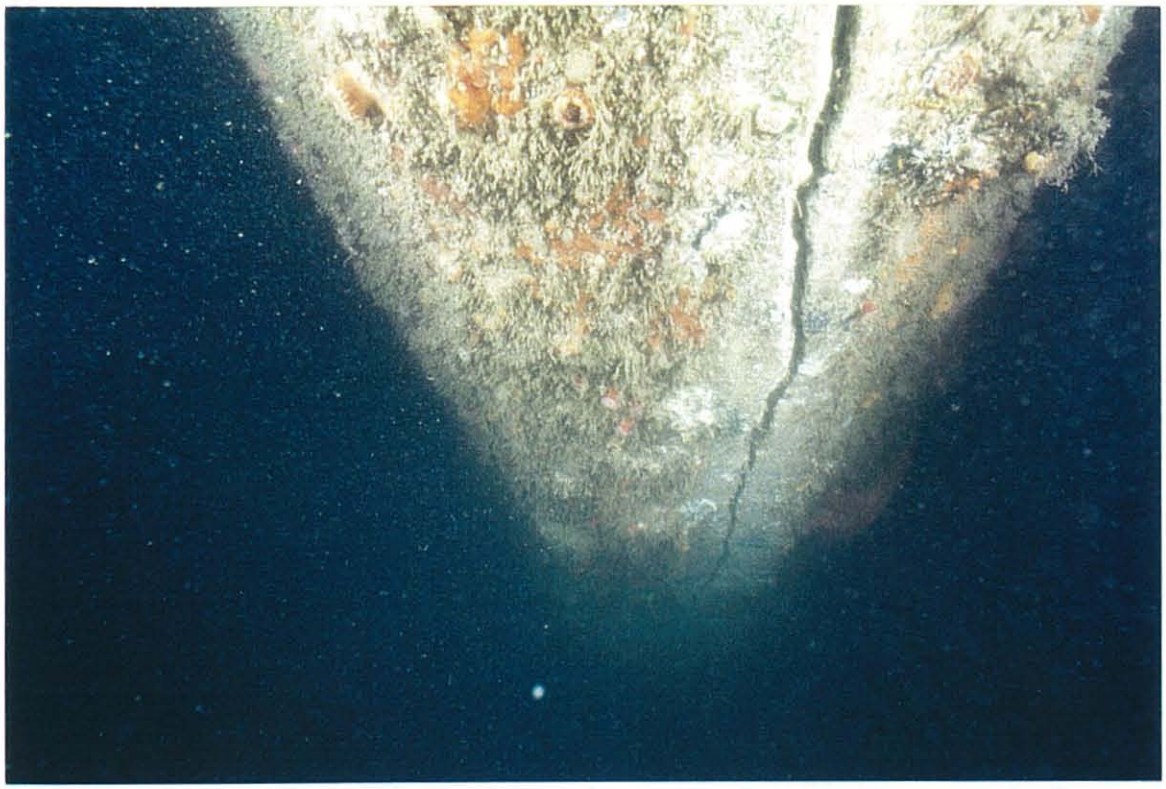


PHOTO 11-16. Vertical underwater crack on side of octagonal prestressed pile, near seabed (courtesy of U.S. Navy/Blaylock Engineering Group).

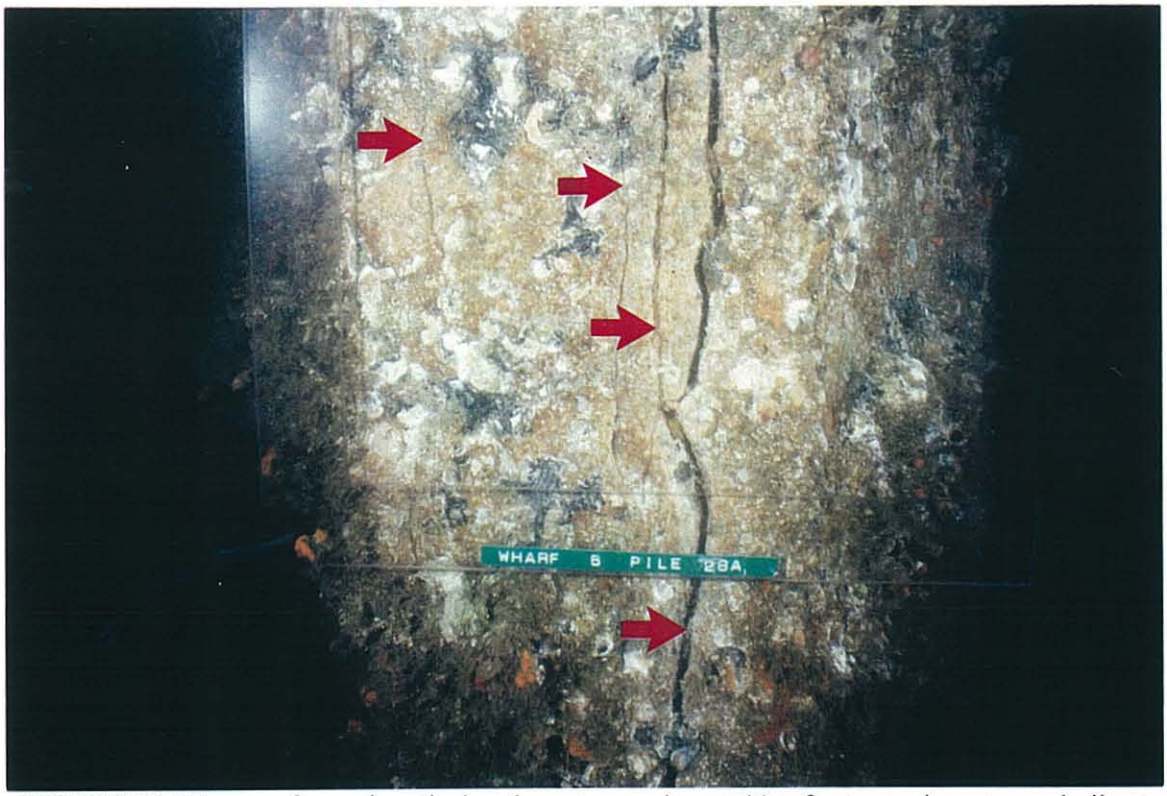


PHOTO 11-17. Several vertical underwater cracks on side of octagonal prestressed pile at elevation – 15 ft (courtesy of U.S. Navy/Blaylock Engineering Group).

TABLE 11-1
PI CRITERIA FOR PILES - ABOVE WATER

1.1.1.a.1.i.1.1 Defect	Prestressed Piles	Non-Prestressed Piles
Breakage	occurrence*	occurrence*
Overstressing Crack	occurrence*	occurrence*
Corrosion Crack	occurrence*	ten percent or more of piles affected
Closed Corrosion Spall	occurrence*	ten percent or more of piles affected
Open Corrosion Spall	occurrence*	five percent or more of piles affected
All Types of Corrosion Defects	occurrence*	ten percent or more of piles affected
Erosion	ten percent or more of piles affected	twenty-five percent or more of piles affected
Underwater Crack (Above Water Extension)	occurrence*	five percent or more of piles, or three piles affected

*a PI is required if there is at least one occurrence of the defect

11.3.3 Criteria for Principal Inspection

As stated above, the results of the RAWI will determine the need for a scope of an AWPI. This need is established by determining whether the number of defects of any type meet the corresponding PI criteria. These criteria were discussed in Section 7.5, are summarized in Table 11-1, and are also identified on the RAWI worksheets.

Particular attention should be attributed to the criterion that a PI is required for non-prestressed piles with corrosion defects if the total number of piles affected by corrosion cracks, closed corrosion spalls, and open corrosion spalls exceeds ten percent. For example, in an inspection unit with 200 piles, if eighteen piles have corrosion cracks, five piles have closed corrosion spalls, and two piles have open corrosion spalls, none of the individual types of corrosion defects meet the PI criteria. However, the total number of affected piles is 25. Since this exceeds ten percent, a PI is required for all piles with corrosion defects. This is illustrated on the sample RAWI worksheet for Piles, which is discussed in the following Section 11.3.4.

As discussed in Section 7.5, the areas (or sections of the inspection unit) to which the PI criteria are applied are determined in the field by the Inspectors, based on their evaluation of the actual distribution of defects on piles.

No specific criteria are provided for mechanical damage, general cracks, and pile built-up cracks, as the presence of these defects will generally not require a PI. However, all defects of these types exceeding in size the criteria indicated in Table 5-1 should be recorded. In addition, Inspectors should note any cases of widespread defects of these types, and enter this information into the comment section of the RAWI Summary Report.

Notification of any Emergency Conditions observed should be made according to Section 7.9 as necessary.

11.3.4 Recording Findings

The number and percentage of piles affected by each of the defects described in Sections 11.1 and 11.2, and their locations, should be identified on the RAWI worksheets. Recording the results of the RAWI for piles does not have any features that differ significantly from the general procedures described in Section 7. Samples of the worksheets for both prestressed and non-prestressed piles are provided on the following two pages, with typical data entered. Copies of the blank worksheets are provided in the Appendix.

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

PRESTRESSED PILES

BERTH NUMBER(S): 142-144 **BENT NOS:** 293-329 **INSPECTION UNIT:** 90

INSP. REQUEST DATE: 1-7-97 **INSPECTOR:** T. Klement **PAGE** 1 **OF** 1

FIELD DATA			PRINCIPAL INSPECTION REQUIREMENT								
			GENERAL							LOCAL	
			INSPECTION UNIT			LIMITED AREA					
DEFECT TYPE	LOCATION OF AFFECTED COMPONENTS	COMMENTS	NUMBER OF COMPONENTS		PERCENT AFFECTED	NUMBER OF COMPONENTS		PERCENT AFFECTED	CRITERIA	CHECK IF SIGNIFICANT LOCALIZED DEFECT(S)	YES / NO
			AFFECTED	TOTAL		AFFECTED	TOTAL				
1	2	3	4	5	6	7	8	9	10	11	12
Breakage									Occurrence *		
Overstressing Crack	293-J, 294-D, 294-J, 294-K, 295-D, 295-G, 295-K, 296-B, 296-J, 296-K, 297-K, 298-E	A	28	395	7%				Occurrence *		Yes
General Crack									----- (1)		
Corrosion Crack	324-I		1	395	<1%				Occurrence *		Yes
Closed Corrosion Spall									Occurrence *		
Open Corrosion Spall	294-I		1	395	<1%				Occurrence *		Yes
All Types of Corrosion Defects	*See listings above*		2	395	<1%				Occurrence *		Yes
Mechanical Damage									----- (1)		
Pile Built-Up Crack	306-K, 307-K, 309-K, 311-K, 313-J, 313-K, 328-B		7	395	2%				----- (1)		No
Erosion									10% or more of piles affected		
Underwater Crack (Above Water Extension)									Occurrence *		
COMMENTS	A: 298-J, 298-K, 299-K, 301-B, 308-I, 308-K, 310-K, 311-I, 312-I, 316-I, 323-J, 328-A, 328-C, 328-D, 328-E, 328.1-A										

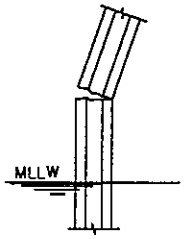
(1)THIS DEFECT WILL GENERALLY NOT REQUIRE A PRINCIPAL INSPECTION.
* A PI IS REQUIRED IF THERE IS AT LEAST ONE OCCURRENCE OF THIS DEFECT.

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

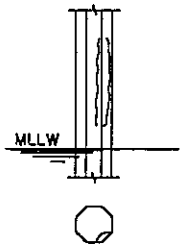
PRESTRESSED PILES

BREAKAGE



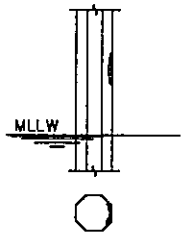
MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE DEFLECTIONS.

CLOSED CORROSION SPALL



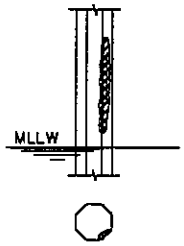
RECESS IN CONCRETE SURFACE CAUSED BY INCOMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. CRACKS ENCIRCLING OR NEARLY ENCIRCLING A FRAGMENT OF CONCRETE INDICATE THAT THE FRAGMENT IS ABOUT TO SPALL OFF.

MECHANICAL DAMAGE



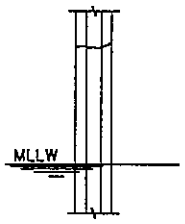
RECESS IN CONCRETE COVER CAUSED BY IMPACT OR CONTINUOUS FRICTION, WITH NO EXPOSED PRESTRESSING STRANDS.

OPEN CORROSION SPALL



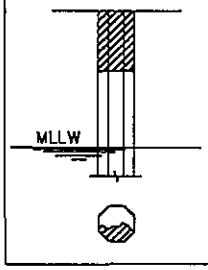
RECESS IN CONCRETE SURFACE CAUSED BY COMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. PRESTRESSING STRAND IS VISIBLE AND MAY BE COVERED WITH CORROSION PRODUCTS.

OVERSTRESSING CRACK



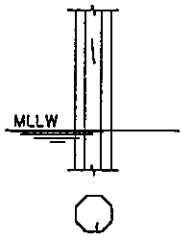
CRACK RESULTING FROM HIGH INTERNAL STRESSES THAT EXCEED STRENGTH OF CONCRETE. OVERSTRESSING CRACKS GENERALLY TEND TO BE CROSS.

PILE/BUILT-UP CRACK



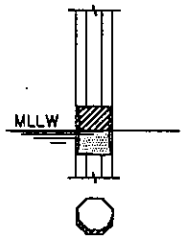
CRACK AT INTERFACE BETWEEN PRECAST PILE AND CAST-IN-PLACE CONCRETE BUILT-UP SECTION. CRACKS ABOVE OR BELOW INTERFACE ARE EITHER OVERSTRESSING, GENERAL, OR CORROSION TYPE.

GENERAL CRACK



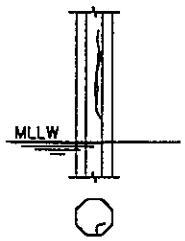
ANY CRACK NOT RESULTING FROM OVERSTRESSING OR CORROSION. APPEARANCE, LOCATION, AND ORIENTATION ARE VARIABLE.

EROSION



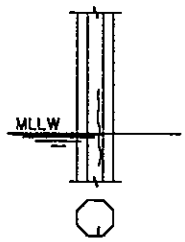
DETERIORATION OF OUTER LAYER OF CONCRETE IN TIDAL ZONE. GENERALLY RESULTS IN ROUNDING OF CORNERS.

CORROSION CRACK



SPLITTING CRACK RESULTING FROM EXPANSION OF CHEMICAL PRODUCTS GENERATED BY CORROSION OF PRESTRESSING STRANDS. CRACKS ARE GENERALLY ORIENTED ALONG PRESTRESSING STRANDS. RED, ORANGE, OR BROWN CORROSION PRODUCTS MAY BE OBSERVED LEACHING FROM CRACK.

UNDERWATER CRACK EXTENSION



TAPERING END OF UNDERWATER CRACK WHICH PROJECTS ABOVE MLLW.

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

EXHIBIT D
REGULAR ABOVE WATER INSPECTION WORKSHEET

PILES

BERTH NUMBER(S): 259-260 **BENT NOS:** 0.1-8 **INSPECTION UNIT:** 183

INSP. REQUEST DATE: 5/2/97 **INSPECTOR:** M. Delaney **PAGE** 1 **OF** 1

FIELD DATA			PRINCIPAL INSPECTION REQUIREMENT								
			GENERAL							LOCAL	
			INSPECTION UNIT			LIMITED AREA					
DEFECT TYPE	LOCATION OF AFFECTED COMPONENTS	COMMENTS	NUMBER OF COMPONENTS		PERCENT AFFECTED	NUMBER OF COMPONENTS		PERCENT AFFECTED	CRITERIA	CHECK IF SIGNIFICANT LOCALIZED DEFECT(S)	YES / NO
			AFFECTED	TOTAL		AFFECTED	TOTAL				
1	2	3	4	5	6	7	8	9	10	11	12
Breakage									Occurrence *		
Overstressing Crack	6-A, 6-B, 5-A, 7-B, 0.1-C		5	20	25%				Occurrence *		Yes
General Crack									----- (1)		
Corrosion Crack	7-B, 4-A, 1-C, 7-C, 3-C		5	20	25%				10% or more of piles affected		Yes
Closed Corrosion Spall	8-A, 8-B, 7-A, 5-B		4	20	20%				10% or more of piles affected		Yes
Open Corrosion Spall									5% or more of piles affected		
All Types of Corrosion Defects	7-B, 4-A, 1-C, 2-C, 3-C, 8-A, 8-B, 7-A, 5-B		9	20	45%				10% or more of piles affected		Yes
Mechanical Damage									----- (1)		
Pile Built-Up Crack									----- (1)		
Erosion									25% or more of piles affected		
Underwater Crack (Above Water Extension)									5% or 3 piles or more affected		
COMMENTS											

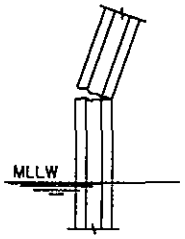
(1) THIS DEFECT WILL GENERALLY NOT REQUIRE A PRINCIPAL INSPECTION.
* A PI IS REQUIRED IF THERE IS AT LEAST ONE OCCURRENCE OF THIS DEFECT.

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

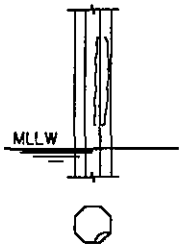
PILES

BREAKAGE



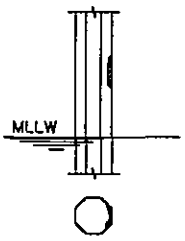
MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE DEFLECTIONS.

CLOSED CORROSION SPALL



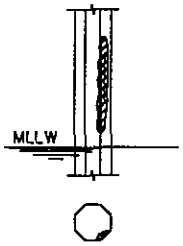
RECESS IN CONCRETE SURFACE CAUSED BY INCOMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. CRACKS ENCIRCLING OR NEARLY ENCIRCLING A FRAGMENT OF CONCRETE INDICATE THAT THE FRAGMENT IS ABOUT TO SPALL OFF.

MECHANICAL DAMAGE



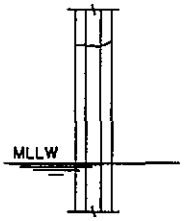
RECESS IN CONCRETE COVER CAUSED BY IMPACT OR CONTINUOUS FRICTION, WITH NO EXPOSED REINFORCING STEEL.

OPEN CORROSION SPALL



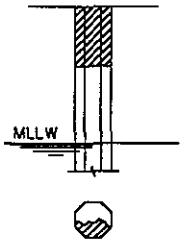
RECESS IN CONCRETE SURFACE CAUSED BY COMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. REINFORCING STEEL IS VISIBLE AND MAY BE COVERED WITH CORROSION PRODUCTS.

OVERSTRESSING CRACK



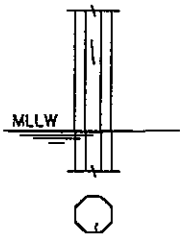
CRACK RESULTING FROM HIGH INTERNAL STRESSES THAT EXCEED STRENGTH OF CONCRETE. OVERSTRESSING CRACKS GENERALLY TEND TO BE CROSS.

PILE/BUILT-UP CRACK



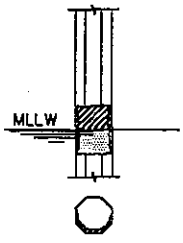
CRACK AT INTERFACE BETWEEN PRECAST PILE AND CAST-IN-PLACE CONCRETE BUILT-UP SECTION. CRACKS ABOVE OR BELOW INTERFACE ARE EITHER OVERSTRESSING, GENERAL, OR CORROSION TYPE.

GENERAL CRACK



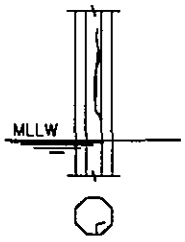
ANY CRACK NOT RESULTING FROM OVERSTRESSING OR CORROSION. APPEARANCE, LOCATION, AND ORIENTATION ARE VARIABLE.

EROSION



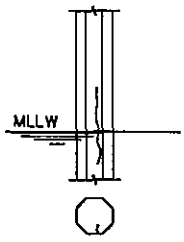
DETERIORATION OF OUTER LAYER OF CONCRETE IN TIDAL ZONE. GENERALLY RESULTS IN ROUNDING OF CORNERS.

CORROSION CRACK



SPLITTING CRACK RESULTING FROM EXPANSION OF CHEMICAL PRODUCTS GENERATED BY CORROSION OF REINFORCING STEEL. CRACKS ARE GENERALLY ORIENTED ALONG REINFORCING STEEL. RED, ORANGE, OR BROWN CORROSION PRODUCTS MAY BE OBSERVED LEACHING FROM CRACK.

UNDERWATER CRACK EXTENSION



TAPERING END OF UNDERWATER CRACK WHICH PROJECTS ABOVE MLLW.

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

The information from the RAWI worksheets should be used for input into the Summary of Regular Above Water Inspection form, which is described in Section 7.6. The contents of the summary form are recorded in the AIRIS Database.

11.4 REGULAR UNDERWATER INSPECTION

11.4.1 Scope Overview

As described in Section 7.1, the Regular Underwater Inspections (RUWIs) are performed primarily to evaluate the condition of concrete piles underwater. However, all other fully or partially submerged components of the structure, such as the retaining structure and/or slope, should also be included in the RUWI. The procedures for conducting RUWIs of retaining structures and slopes are presented in Section 14 and 15, respectively.

The Regular Underwater Inspection of piles is performed from El +3 ft MLLW to the seabed. El +3 ft MLLW corresponds approximately to the upper extent of marine growth. Some of the defects located above MLLW may not be visible during the RAWI if the water level during any part of the inspection is above MLLW. It is therefore required that any damage on piles within 3 ft above MLLW be recorded during RUWIs. Above water extensions of defects found below MLLW are also included in the scope of the RUWI.

RUWIs should be performed on at least ten percent of the total number of piles in the inspection unit. The work during the RUWI includes visual inspection of all defects noticeable after the partial cleaning of piles, as described in Section 11.4.2.

The findings of the RUWI on piles may determine the need for a PI of the inspection unit. They may also result in other possible recommended actions (Emergency, Special Inspection, etc.). The results of the inspection of piles form the primary basis of the Overall Repair Priority Rating assigned as a result of a RUWI.

11.4.2 Procedures

The general procedures for executing RUWIs as described in Section 7. The procedures for executing RUWIs differ significantly from that for RAWIs due to limited underwater visibility and the need to remove marine growth. The inspection is performed on a limited sample of piles. It is recommended that sample piles chosen for the Level II inspection be in a uniform pattern. A good practice is to follow a diagonal pattern, i.e., 1-A, 2-B, 3-C, etc. This pattern provides for the inspection of piles in all potential locations and water depths. Batter piles should be included in this pattern in representative quantities.

Level I and Level II inspections should be conducted as described in Section 7.1.2. Photo 11-18 shows an example of a pile with marine growth removed to facilitate a Level II inspection. Air-driven underwater tools are recommended for efficient marine growth removal. Bands narrower than 12 inches are not acceptable because they do not provide a sufficient viewing window. For piles with submerged portions less than 10 ft, the number of bands to be cleaned can be reduced in accordance with the following criteria:

Submerged Length (distance below MLLW)	Number of Bands
> 10 ft	3
5 ft to 10 ft	2 (top and bottom)
< 5 ft	1 (middle)

The findings should first be recorded directly on master sketches. A typical record for a RUWI should contain the type of defect found, side or corner of pile where defect was found, and dimensions observable within the cleaned band. The position of defect recorded during a RUWI should be the band on which it was found (top, middle or bottom). Size parameters, such as length and area, should be recorded only if they are easily observable and the evaluation does not require additional cleaning. All this information should be recorded on the master sketch at or near the inspected piles in a conspicuous way so that it is clear to which pile the record is related, as shown in the sample master sketch shown on the second page following.

The records from the master sketches then should be transferred onto RUWI field forms, as shown in the example on the third page following. The form includes columns for pile ID, location of defect, its observable size, and an indication of whether the defect was included in the PI evaluation. Information illustrating the guidelines for recording of defects is presented on the back side of the form. The RUWI field form may be prepared either in the field or in the office (using master sketch records made in the field).

PHOTO 11-18. Approximately 12-in. high band, cleaned of marine growth for underwater Level II Inspection of prestressed pile.

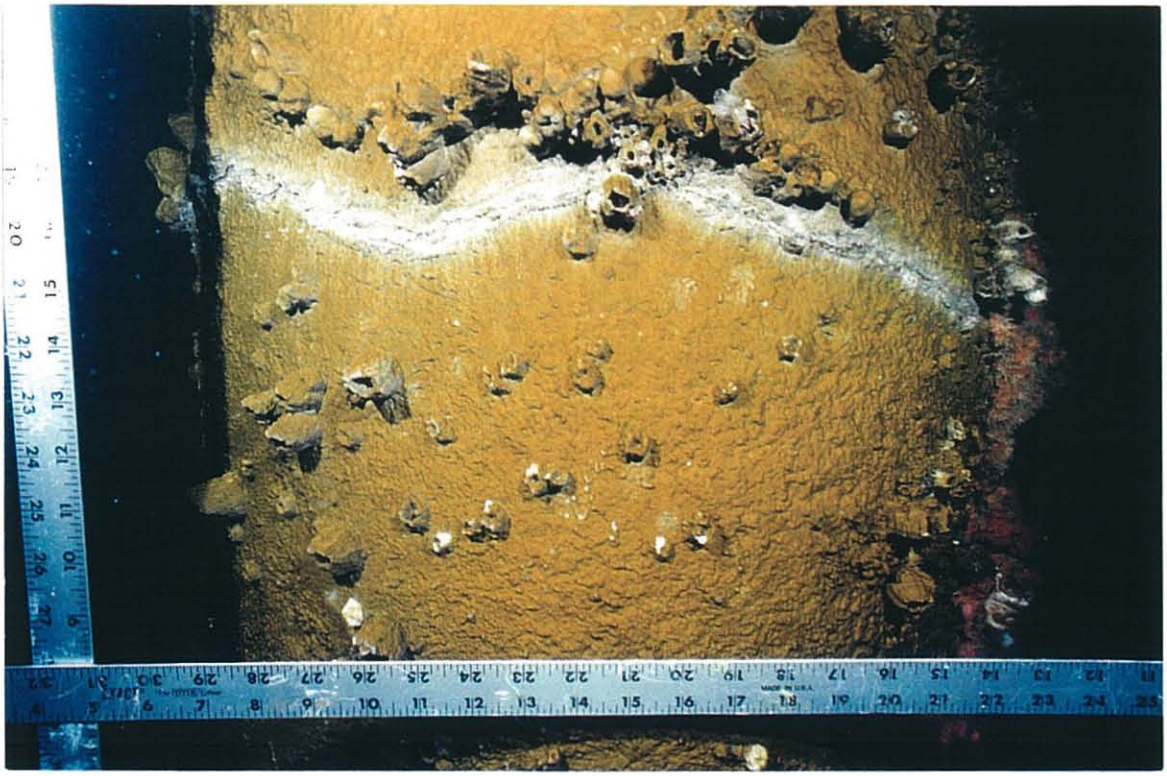
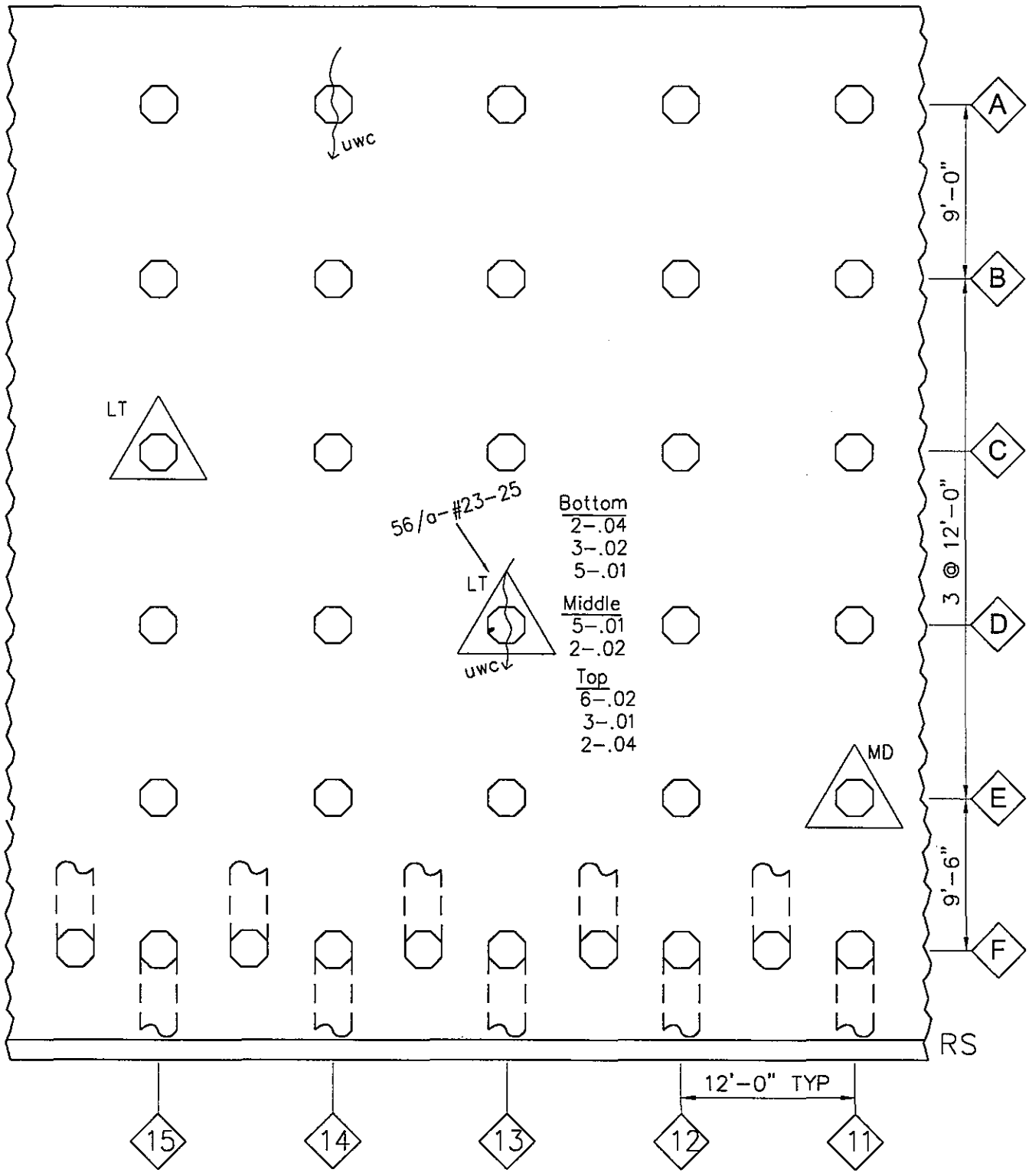


PHOTO 11-19. Underwater overstressing crack on round concrete pile.

EXHIBIT D

DATE: 14Apr97 PAGE NO.: 3

INSPECTOR: T. Klement BENTS: 11-15



MASTER SKETCH
INSPECTION UNIT 50
BERTH(S) 87-89

NOT TO SCALE

600-29\Prorgam Manual\Dec1999Ver\Figures\Fig50-2.dwg

EXHIBIT D

REGULAR UNDERWATER INSPECTION FIELD FORM

PRESTRESSED PILE

BERTH NO(S): 174-176 BENT NOS: 01-57 INSPECTION UNIT: 107

INSP. REQUEST DATE: 6/17/97 INSPECTOR: Larry Tucker PAGE 3 OF 13

PILE ID / DEFECT	LOCATION OF COMPONENT DEFECT	SIZE OF COMPONENT DEFECT	INCLUDED IN PI EVALUATION (YES/NO)
P-38.1-D Underwater Crack	S: 8 O: Long P: Bottom	W: 0.01	Yes
P-38.1-D Underwater Crack	S: 7 O: Long P: Bottom	W: 0.01	Yes
P-38.1-D Underwater Crack	S: 1 O: Long P: Middle	W: 0.04	Yes
P-38.1-D Underwater Crack	S: 8 O: Long P: Middle	W: 0.01	Yes
P-38.1-D Underwater Crack	S: 7 O: Long P: Middle	W: 0.01	Yes
P-38.1-D Mechanical Damage	S: 4 C: - P: Middle	A: 0.03 D: 0.25 M: 0.17	Yes
P-41-B Underwater Crack	S: 6 O: long P: Bottom	W: 0.01	Yes
P-41-B Underwater Crack	S: 6 O: long P: Middle	W: 0.01	Yes
P-41-B Underwater Crack	S: 2 O: Long P: Middle	W: 0.01	Yes

NOTE: PRINCIPAL INSPECTION IS REQUIRED IF THE FOLLOWING CONDITIONS ARE ENCOUNTERED DURING REGULAR UNDERWATER INSPECTION:

a) Occurrence of breakage or overstressing crack.
b) Occurrence of corrosion crack, closed corrosion spall, or open corrosion spall.
c) Erosion on 10 percent or more of inspected piles.
d) Occurrence of underwater cracks.

EXHIBIT D

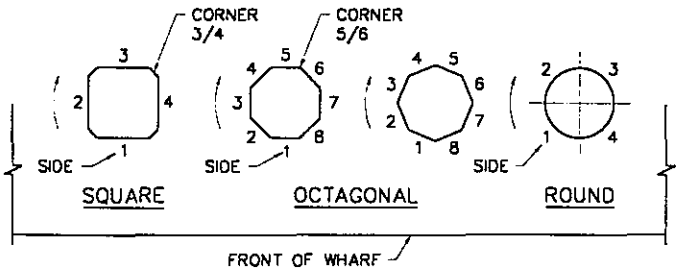
PRESTRESSED PILES UNDERWATER

S - SIDE
C - CORNER
XX - DEFECT APPEARS ON ALL SIDES OR CORNERS

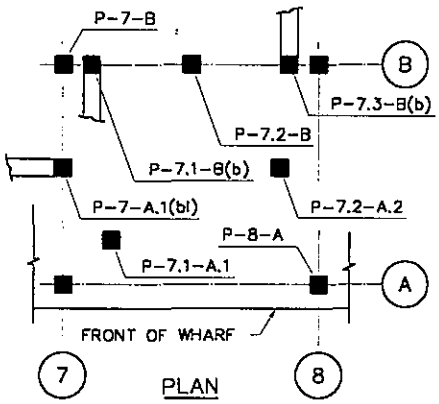
O - CRACK ORIENTATION
LONG - LONGITUDINAL
CROSS - CROSS
DIAG - DIAGONAL

A - AREA (SF)
D - DEPTH (IN.)
L - LENGTH (FT)
M - MAXIMUM DIMENSION (FT)
W - CRACK WIDTH (IN.)

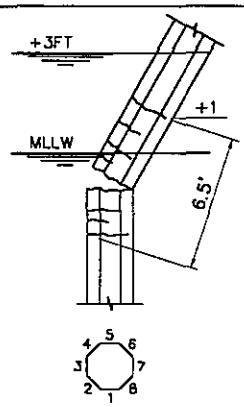
P - POSITION/BAND
TOP - TOP
MID - MIDDLE
BOT - BOTTOM



DEFECT LOCATION KEY

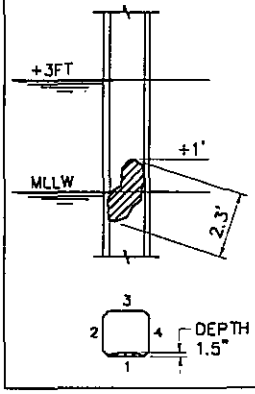


BREAKAGE



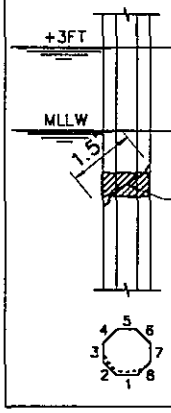
LOCATION	SIZE	COMMENT
S: XX C: – P: TOP	M: 6.5 D: 18.0	

MECHANICAL DAMAGE



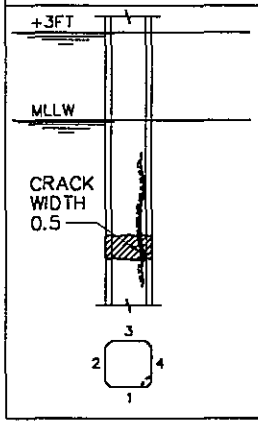
LOCATION	SIZE	COMMENT
S: 1 C: – P: TOP	A: 3.5 D: 1.5 M: 2.3	

GENERAL/OVERSTR. CRACK



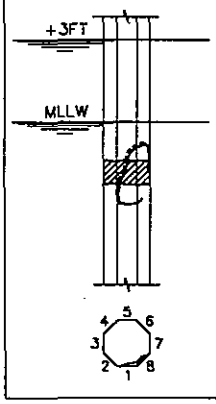
LOCATION	SIZE	COMMENT
S: 8–3 P: TOP C: – O: DIAG	L: 1.5 W: 0.03	RANDOM CRACK

CORROSION CRACK



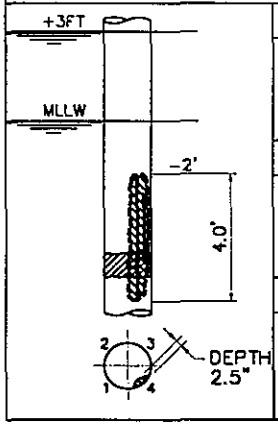
LOCATION	SIZE	COMMENT
S: – P: MID C: 1/4 O: LONG	L: 5.0 W: 0.5	DOUBLE CRACK

CLOSED CORROSION SPALL



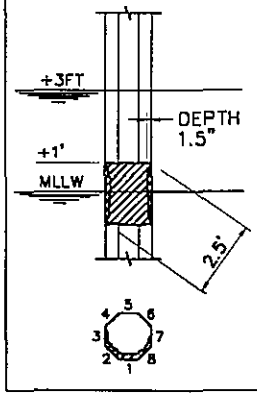
LOCATION	SIZE	COMMENT
S: 1,8 C: – P: TOP	A: 5.0 M: 2.5	

OPEN CORROSION SPALL



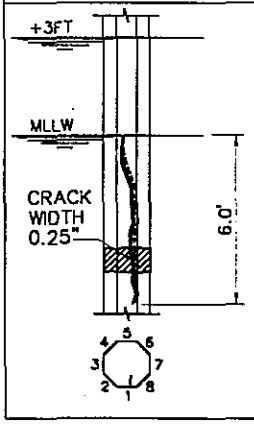
LOCATION	SIZE	COMMENT
S: 4 C: – P: MID	A: 3.5 N: 2 D: 2.5 M: 4.0	REMAINING REBAR DIA. (LONG. BARS) 0.75 IN.

EROSION



LOCATION	SIZE	COMMENT
S: 7–3 C: – P: TOP	A: 7.5 D: 1.5 M: 2.5	NO REBARS EXPOSED

UNDERWATER CRACK



LOCATION	SIZE	COMMENT
S: 1 P: MID C: – O: LONG	L: 6.0 W: 0.25	

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

Field observations of the condition of the underwater portions of the slope should also be recorded on the master sketches. Since the relevant observations are limited to strictly visual evaluation of major changes in the slope geometry (large cavities, undermining), no specific format for these records is provided in the Program. However, all necessary information should be included in the comment field of the RUWI worksheets as well as in the Additional Information field of the RUWI Summary Report, as described in Section 7.6.

11.4.3 Criteria for Principal Inspection

The need to a PI is established by determining whether the number or percentage of defects of any type meet the corresponding criteria. These criteria were discussed in Section 7.5, are summarized in Table 11-2, and are also identified on the RUWI worksheets. Photo 11-19 shows an underwater overstressing crack while Photo 11-20 illustrates an underwater corrosion crack. Mechanical damage will generally not require a PI, and therefore no criteria for a PI is provided for this defect.

Notification of any Emergency Conditions observed should be made according to Section 7.9 as necessary.

11.4.4 Recording Findings

The data from the RUWI Field Forms should be transferred to the RUWI worksheets. A sample worksheet is shown on the second page following, with typical data entered. Copies of the blank worksheets are provided in the Appendix.

The information from the RUWI worksheets should be used for input into the Summary of Regular Underwater Inspection Form, which is described in Section 7.6. The contents of the summary form are recorded in the AIRIS Database.

11.5 PRINCIPAL INSPECTION

A Principal Inspection may be performed either above water or underwater. During a PI of piles, only defects which meet or exceed the criteria indicated in Table 5-1 should be recorded. Refer to Section 8 for detailed guidelines on conducting Principal Inspections. Parameters to be recorded for each type of defect are discussed below.

a) **Breakage:** Location, maximum dimension, and depth should be recorded. In addition, any broken or exposed reinforcing bars should be identified, and their condition should be recorded. The cause of the breakage should also be recorded in the Comments field, if it is known.

b) **Overstressing Crack:** Location, length, and orientation should be recorded. In addition, each crack should have its maximum width visually estimated or *measured*, using a crack comparator, and recorded. The cause of the crack should be identified, if possible.

TABLE 11-2
PI CRITERIA FOR PILES - UNDERWATER

Defect	Prestressed Piles	Non-Prestressed Piles
Breakage	occurrence*	occurrence*
Overstressing Crack	occurrence*	occurrence*
Corrosion Crack, Closed Corrosion Spall, Open Corrosion Spall, or a Combination of the Three	occurrence*	five percent or more of piles or three piles affected
Erosion	ten percent or more of piles affected	twenty-five percent or more of piles affected
Underwater Crack	occurrence*	five percent or more of piles or three piles affected

*a PI is required if there is at least one occurrence of the defect

PHOTO 11-20. Underwater Corrosion cracks at corner of concrete pile.

REGULAR UNDERWATER INSPECTION WORKSHEET

EXHIBIT D

PRESTRESSED PILES

BERTH NUMBER(S): 174-176 **BENT NOS:** 1-57 **INSPECTION UNIT:** 107

INSP. REQUEST DATE: 6/17/97 **INSPECTOR:** Larry Tucker **PAGE** 1 **OF** 1

FIELD DATA			PRINCIPAL INSPECTION REQUIREMENT								
			GENERAL							LOCAL	
			INSPECTION UNIT			LIMITED AREA					
DEFECT TYPE	LOCATION OF AFFECTED COMPONENTS	COMMENTS	NUMBER OF COMPONENTS INSPECTED		PERCENT AFFECTED	NUMBER OF COMPONENTS INSPECTED		PERCENT AFFECTED	CRITERIA	CHECK IF SIGNIFICANT LOCALIZED DEFECT(S)	YES / NO
			AFFECTED	TOTAL		AFFECTED	TOTAL				
1	2	3	4	5	6	7	8	9	10	11	12
Breakage									Occurrence *		
Overstressing Crack									Occurrence *		
General Crack									----- (1)		
Underwater Crack	6-D, 9-E, 19-C, 31-A, 38.1-D, 41-B, 45-B, 47-C	A	12	42	29%				Occurrence *		Yes
Corrosion Crack									Occurrence *		
Closed Corrosion Spall									Occurrence *		
Open Corrosion Spall									Occurrence *		
All Types of Corrosion Defects									Occurrence *		
Mechanical Damage	1-A, 3-B, 6-D, 7-E, 10.1-D, 19-C, 20-D, 48-D, 50-D	B	12	42	29%				----- (1)		No
Pile Built-Up Crack									----- (1)		
Erosion									10% or more of components affected		

COMMENTS

A: 48-D, 50-D, 53-D, 57-A

B: 52-E, 53-D, 38.1-D (these mechanical defects are due to lifting eye loops which were not epoxied. Each defect is listed individually on the field form).

(1) THIS DEFECT WILL GENERALLY NOT REQUIRE A PRINCIPAL INSPECTION
* A PI IS REQUIRED IF THERE IS AT LEAST ONE OCCURRENCE OF THIS DEFECT

c) **Corrosion Crack:** Location, length, and orientation should be recorded. In addition, the width of all cracks should be *estimated* and recorded. For a representative number of cracks with widths of 0.25 in. or larger on non-prestressed piles, the concrete cover should be removed, the reinforcing bars beneath the cracks should be cleaned, and their remaining diameters measured.

d) **Closed Corrosion Spall:** Location, area, and maximum dimension should be recorded. This should include all areas of drummy concrete. On non-prestressed piles, the concrete cover should be removed from a representative number of spalls having a crack width of 0.25 in. and larger. The reinforcing bare beneath the spalls should then be cleaned, and their remaining diameters measured.

e) **Open Corrosion Spall:** Location, area, depth, and maximum dimension should be recorded. A representative sample of bars should be cleaned, and their remaining diameters measured and recorded. On prestressed piles, the strand is usually completely corroded at the stage of initial cracking of the concrete cover. Removing the concrete cover would most likely reveal a severely corroded strand(s), with the remaining wires firmly embedded in the concrete, as shown in Figure 8-6. For PIs, it is recommended that the concrete around the remaining portion of strand not be removed, because this will accelerate the corrosion. However, removal of the concrete cover may be required for a Special Inspection.

f) **Erosion:** Location, area, depth, and maximum dimension should be recorded.

g) **Underwater Crack:** Location, length, and orientation should be recorded. In addition, the width of each crack should be estimated and recorded. As described in Section 11.2.3, underwater cracks should be recorded during PIs regardless of their size. The priority of repairs assigned to them is "IN", as discussed in Section 5.3. No records for the estimated repairs are required.

11.5.1 Above Water Principal Inspection

a) **Scope Overview**
The scope of the Above Water Principal Inspection of piles should be based on the results reported in the Summary of RAWI form, as discussed in Section 7.6.2. All piles within the range of bent numbers indicated in the Summary of RAWI form should be inspected for the defect types identified therein. The PI is performed to determine the location and size of each defect exceeding the recording criteria indicated in Table 5-1. All the information should be entered into the ADC or on the Principal Inspection Field Form for Piles Above Water. In addition, a Summary Report of the results of the PI should be prepared.

b) **Procedures**
The AWPI of piles should be performed in accordance with the general guidelines presented in Section 8. As in the case for the RAWI, the AWPI for piles should be performed at or near low tide. This is a very important requirement since defects such as the above water extensions of underwater cracks and erosion may not be visible otherwise. Each defect should be examined visually, and its size and location recorded.

Areas in the vicinity of closed corrosion spalls should be sounded with an inspection hammer to clearly define their extent, including determination of whether there is any drummy concrete. The extent of closed corrosion spalls, including drummy concrete characterized by delaminations, can be identified by listening to the sound of the hammer hitting the concrete. A "ping" is characteristic of sound concrete, whereas a hollow sounding "puck" indicates the presence of delaminations.

The inspection is aimed at defect types which are included in the Summary of RAWI form. However, as discussed in Section 8, Inspectors should record any other defects which should be repaired according to provisions of Section 5.

An illustration of the method for locating PI defects and identifying their sizes is provided on the reverse side of the PI Field Form.

c) **Defect Location and Size**
The location of a defect in the plane of the pile's cross section is recorded as a side or corner. The position of a defect along the pile above water is recorded as the distance (in feet) of the uppermost extent of the defect from the top of pile. The same rule applies to the position of defects in the tidal zone, such as above water extensions of underwater cracks, erosion, etc. The crack orientation on piles

is determined and recorded as described in Section 8.4.7.

The following are the basic rules for identifying the locations of defects on piles:

- All locations are described relative to the face of the berth, with the Inspector looking shoreward.
- Pile sides are identified by consecutive numbers, with the number "1" assigned to the closest parallel side to the berth's face, and the remaining sides numbered clockwise when looking down at the pile in plan. If none of the sides are parallel to the face, the number "1" is assigned to the side immediately clockwise from the corner closest to the face. If a defect is located on several adjoining sides, e.g., 1, 2, 7, and 8, on an octagonal pile, the range of sides, proceeding clockwise, is used to define the location, i.e., Sides 7-2.
- Pile corners are identified by the numbers of the two sides forming the corner, with the smaller number preceding the larger number, and the two separated by a slash.
- Round piles are divided into four quadrants which, for identification purposes, are considered as sides. The number "1" is assigned to the first side encountered when progressing clockwise from 0°.

The sketches on the lower portion of the reverse side of the Principal Inspection Field Form for Piles show examples for identifying the location and size of each defect described in Sections 11.1 and 11.2. The parameters used to describe the size of each defect are identified in Section 4.

All parameters and their abbreviations used for recording defects on piles are listed in the upper left corner on the reverse side of the Principal Inspection Field Form for Piles. The basic rules for identifying the location of defects on piles are illustrated in the upper middle portion of the same sheet.

d) Recording Findings

Inspection findings should be entered directly into the ADC device as described in Section 8. Alternatively, paper forms (Principal Inspection Field Form) may be used, with the data entered into AIRIS later at the office. The same form should be used for both prestressed and non-prestressed piles. A sample form, with typical data entered, is provided on the following page. Copies of the blank forms are provided in the Appendix. The results of the AWPI of piles should be included in the Above Water Principal Inspection Summary Report as described in Section 8.6.

Notification of any Emergency Conditions observed should be made according to Section 8.9 as necessary.

11.5.2 Underwater Principal Inspection

a) Scope Overview

The scope of the Underwater Principal Inspection of piles involves inspecting the piles for the types of defects and at the location(s) itemized on the Summary of Regular Underwater Inspection form. All piles within the range of bent numbers indicated in the Summary of RAWI form should be inspected for the defect types identified therein. The PI is performed to determine the location and size of each defect exceeding the recording criteria indicated in Table 5-1. All the information should be entered into the ADC or on the Principal Inspection Field Form for Piles Underwater. In addition, a Summary Report of the results of the PI should be prepared.

b) Procedures

The Underwater Principal Inspection of piles should be performed in accordance with the general guidelines presented in Section 8. The procedures to be used during the UWPI may vary greatly with the type of repairs anticipated, as discussed in Section 8.1. The following procedural options may be used as the circumstances dictate:

- *Option 1:* Inspect every pile by removing marine growth until pre-established repair criteria are met. Marine growth removal may be limited to certain zones (tidal zone, mudline area, one face of pile, etc.) of the pile, or may include the entire underwater length of the pile, depending on if and where the damage is isolated. An example of Option 1 would be where the criteria for jacketing of piles is established. As soon as observed deterioration meets the established criteria, the need for a jacket is confirmed and marine growth removal may cease. It may be necessary to remove all marine growth from the entire pile to determine that the criteria for jacketing has not been met.

EXHIBIT D

PRINCIPAL INSPECTION FIELD FORM

PILES ABOVE WATER

BERTH NOS: 420-421 **INSP. REQUEST DATE:** 5/3/99 **INSPECTION UNIT:** 325
BENT NOS: 101-145 **DATE OF INSPECTION:** 11/10/99 **INSPECTOR:** J. JONES

COMPONENT ID / DEFECT TYPE	EXISTING DEFECT: LOCATION	SIZE	PREV. REPAIR	REPAIR PRIORITY	PS	UW	COMMENT	ESTIMATED REPAIR PARAMETERS: GENERAL REPAIR TYPE (GRT)	SIZE OF REPAIR	SPECIFIED REPAIR METHOD (SRM)
P-103-A BREAKAGE	S: XX C: - P: 1	M: 6.0 D: 18.0		PR	X		Double breakage of pile can be repaired by structural concrete jacket.	EN	L: 10.0	JA (Jacket)
P-108-B CORROSION CRACK	S: - C: 1/4 O: LONG P: 3	L: 5.0 W: 0.5	X	PR	X		Re-cracked patch. Shotcrete repair.	AR	A: 5.0 D: 4.5	SH (Shotcrete)
P-108-B OVERSTRESSING CRACK	S: 1, 2, 4 C: - O: CROSS P: 2	L: 2.0 W: 0.12		MT	X			LN	L: 2.0 W: 5.0	EI (Epoxy Injection)
P-115-C MECHANICAL DAMAGE	S:1 C: - P: 3	A: 3.0 D: 1.5 M: 2.4		MT	X		Impact spall on side of pile.	AR	A: 3.0 D: 2.0	TR (Trowel)
P-115-C UNDERWATER CRACK	S: 1 C: - O: LONG P: 3.0	L: 1.0 W: 0.25		IN	X	X	Above-water extension of UW crack.	TBD		

NOTES:
Prev. Repairs - Check "X" if defect was previously repaired
Repair Priority - Check "EM" - Emergency, "PR" - Priority, "MT" - Maintenance, "IN" - To Be Investigated
PS - Check "X" if defect may cause damage to prestressing reinforcement
UW - Check "X" if defect is underwater or below EL +3.0 ft

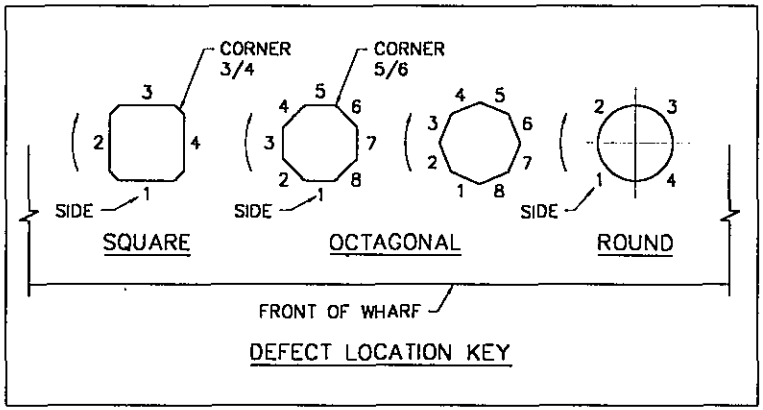
11-27

EXHIBIT D

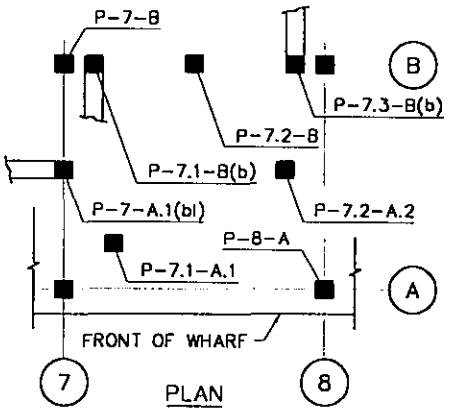
PRESTRESSED / NON-PRESTRESSED PILES - ABOVE WATER

S – SIDE
C – CORNER
XX – DEFECT APPEARS ON ALL SIDES OR CORNERS
P – POSITION (DISTANCE FROM TOP OF PILE, FT)
O – CRACK ORIENTATION
LONG – LONGITUDINAL
CROSS – CROSS
DIAG – DIAGONAL

A – AREA (SF)
D – DEPTH (IN.)
L – LENGTH (FT)
M – MAXIMUM DIMENSION (FT)
N – NO. OF EXPOSED REBARS
W – CRACK WIDTH AND EST. WIDTH OF REPAIR
GRT – GENERAL REPAIR TYPE
LN – LINEAL
AR – AREAL
EN – ENCASEMENT
TDB – TO BE DETERMINED

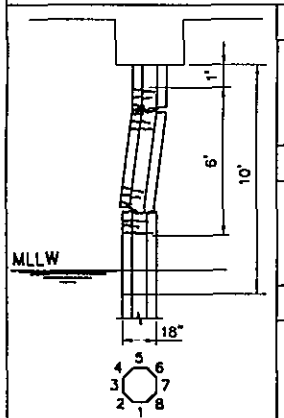


DEFECT LOCATION KEY



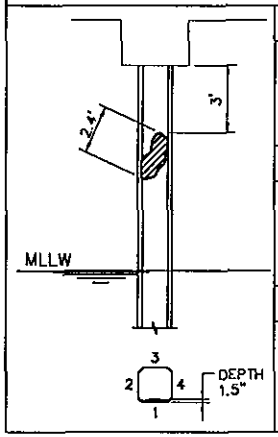
PLAN

BREAKAGE



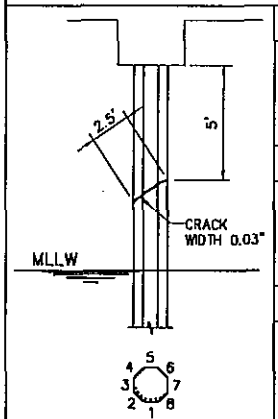
LOCATION	
S: XX	P: 1
C: –	
INSP. SIZE	EST. SIZE
M: 6.0	GRT: EN
D: 18.0	L: 10.0
COMMENT	
DOUBLE BREAKAGE	

MECHANICAL DAMAGE



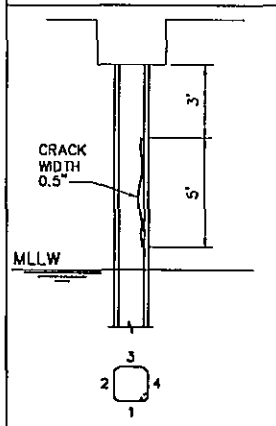
LOCATION	
S: 1	
C: –	
P: 3	
INSP. SIZE	EST. SIZE
A: 3.0	GRT: AR
D: 1.5	A: 3.0
M: 2.4	D: 2.0
COMMENT	
SIDE SPALL	

GENERAL/OVERSTR. CRACK



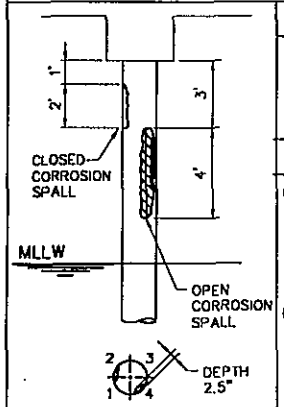
LOCATION	
S: 8–3	P: 5
C: –	
O: DIAG	
INSP. SIZE	EST. SIZE
L: 2.5	GRT: LN
W: 0.04	L: 2.5
	W: 2.0
COMMENT	
RANDOM CRACK	

CORROSION CRACK



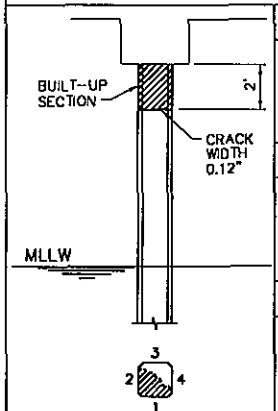
LOCATION	
S: –	P: 3
C: 1/4	
O: LONG	
INSP. SIZE	EST. SIZE
L: 5.0	GRT: AR
W: 0.5	A: 5.0
	D: 4.5
COMMENT	
DOUBLE CRACK	

CORROSION SPALL



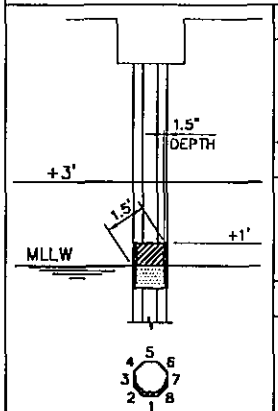
LOCATION	
(OPEN)	(CLOSED)
S: 4	S: 1,2
C: –	C: –
P: 3	P: 1
INSP. SIZE	EST. SIZE
(OPEN)	(OPEN)
A: 3.5	GRT: AR
D: 2.5	A: 5.0
M: 4.0	D: 4.5
N: 2.0	
(CLOSED)	(CLOSED)
A: 2.5	GRT: AR
	A: 3.0
M: 2.0	D: 4.5

PILE/BUILT-UP CRACK



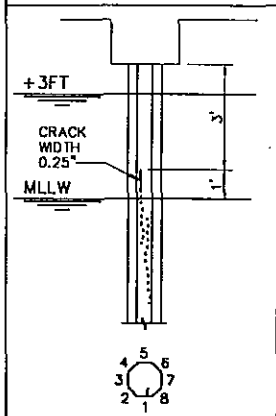
LOCATION	
S: 1,2,4	P: 2
C: –	
O: CROSS	
INSP. SIZE	EST. SIZE
L: 2.0	GRT: LN
W: 0.12	L: 2.0
	W: 5.0
COMMENT	

EROSION



LOCATION	
S: 7–3	
C: –	
P: 2	
INSP. SIZE	EST. SIZE
A: 3.5	GRT: EN
D: 1.5	L: 3.0
M: 1.5	
COMMENT	
NO REBARS EXPOSED	
UNDERWATER DEFECT	

UNDERWATER CRACK



LOCATION	
S: 1	P: 3
C: –	
O: LONG	
INSP. SIZE	EST. SIZE
L: 1.0	
W: 0.25	
COMMENT	
ABOVE WATER EXTENSION	
UNDERWATER DEFECT	

- *Option 2:* Inspect every pile by removing marine growth completely on each pile to document each defect. Marine growth removal may be limited to certain zones (tidal zone, mudline area, one face of pile, etc.) of the pile, or may include the entire underwater length of the pile, depending on if and where the damage is isolated. An example of Option 2 would be where defects are intended to be repaired on an individual basis, such as epoxy injection or sealing. In such cases, each defect must be documented in order to generate a repair bid package and project estimate.

In some cases, the nature of the damage may dictate inspection below the mudline. Such special cases would require excavation around the base of each pile to pre-determined limits.

c) Defect Location and Size

Documentation of each defect's location and size should follow the same guidelines as for Above Water Principal Inspections.

d) Recording Findings

Inspection findings should be entered directly into the ADC device as described in Section 8. Alternatively, paper forms (Principal Inspection Field Form) may be used, with the data entered into AIRIS later at the office. The same form should be used for both prestressed and non-prestressed piles.

A sample form, with typical data entered, is provided on the second page following. Copies of the blank forms are provided in the Appendix. The results of the UWPI of piles should be included in the Underwater Principal Inspection Summary Report as described in Section 8.6.

Notification of any Emergency Conditions observed should be made according to Section 8.9 as necessary.

EXHIBIT D

PRINCIPAL INSPECTION FIELD FORM

PILES UNDERWATER

BERTH NOS: 323-324 **INSP. REQUEST DATE:** 5/4/99 **INSPECTION UNIT:** 267
BENT NOS: 205-260 **DATE OF INSPECTION:** 11/11/99 **INSPECTOR:** M. JENKINS

COMPONENT ID / DEFECT TYPE	EXISTING DEFECT: LOCATION	SIZE	PREV. REPAIR	REPAIR PRIORITY	PS	UW	COMMENT	ESTIMATED REPAIR PARAMETERS: GENERAL REPAIR TYPE (GRT)	SIZE OF REPAIR	SPECIFIED REPAIR METHOD (SRM)
P-206-A BREAKAGE	S: XX C: - P: 3	M: 6.5 D: 18.0		PR	X	X	Double breakage of pile underwater repairs can be done by structural jacket.	EN	L: 8.0	JA (Jacket)
P-207-B OVERSTRESSING CRACK	S: 8-3 C: - O: DIAG P: 8	L: 1.5 W: 0.04		PR	X	X	Rust stains along crack length. Corrosion of strands suspected.	LN	L: 2.0 W: 2.0	EI (Epoxy Injection)
P-207-C UNDERWATER CRACK	S: 1 C: - O: LONG P: 4	L: 6.0 W: 0.25		IN	X	X	No signs of corrosion products.	TBD		
P-208-C OPEN CORROSION SPALL	S: 4 C: - P: 5	A: 3.5 D: 2.5 M: 4.0 N: 2		PR	X	X	Two strands exposed. All wires intact but rusting.	AR	A: 6.0 D: 3.0	TR (Trowel)

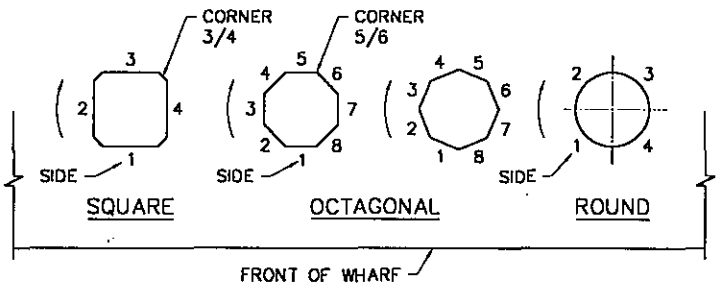
NOTES:
Prev. Repairs - Check "X" if defect was previously repaired
Repair Priority - Check "EM" - Emergency, "PR" - Priority, "MT" - Maintenance, "IN" - To Be Investigated
PS - Check "X" if defect may cause damage to prestressing reinforcement
UW - Check "X" if defect is underwater or below EL +3.0 ft

EXHIBIT D

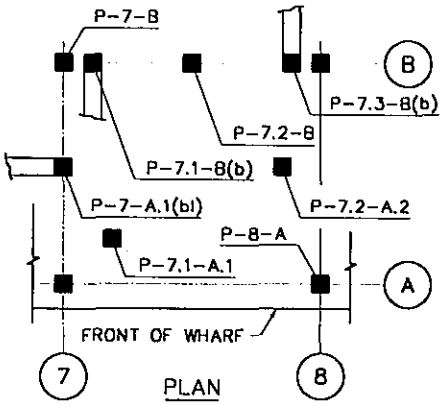
PRESTRESSED / NON PRESTRESSED PILES - UNDERWATER

S – SIDE
C – CORNER
XX – DEFECT APPEARS ON ALL SIDES OR CORNERS
P – POSITION (RELATIVE TO +3FT MLLW)
O – CRACK ORIENTATION
LONG – LONGITUDINAL
CROSS – CROSS
DIAG – DIAGONAL

A – AREA (SF)
D – DEPTH (IN.)
L – LENGTH (FT)
M – MAXIMUM DIMENSION (FT)
N – NO. OF EXPOSED REBARS
W – CRACK WIDTH AND EST. WIDTH OF REPAIR
GRT – GENERAL REPAIR TYPE
LN – LINEAL
AR – AREAL
EN – ENCASEMENT
TDB – TO BE DETERMINED

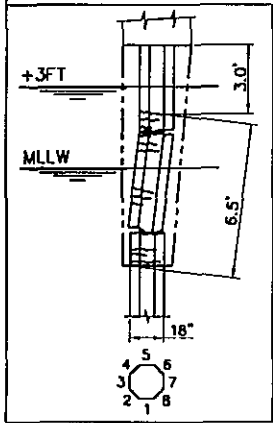


DEFECT LOCATION KEY



PLAN

BREAKAGE

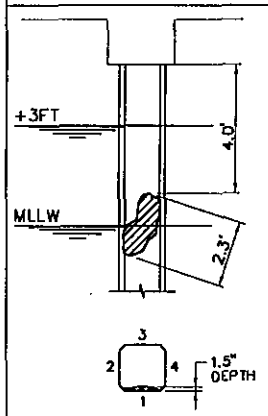


LOCATION
S: XX
C: –
P: 3

INSP. SIZE	EST. SIZE
M: 6.5 D: 18	GRT: EN L: 8.0

COMMENT

MECHANICAL DAMAGE

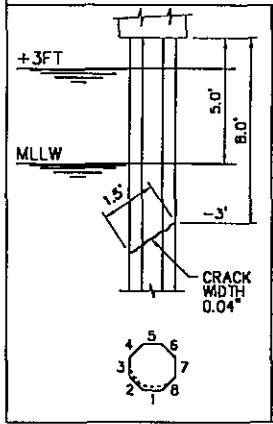


LOCATION
S: 1
C: –
P: 4

INSP. SIZE	EST. SIZE
A: 3.5 D: 1.5 M: 2.3	GRT: EN L: 4.0

COMMENT

GENERAL/OVERSTR. CRACK

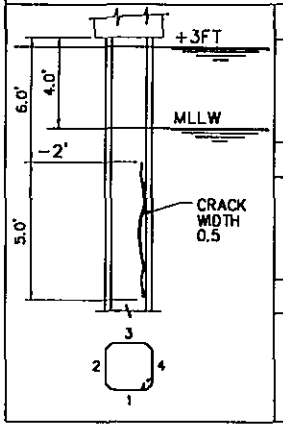


LOCATION
S: 8-3 P: 8
C: –
O: DIAG

INSP. SIZE	EST. SIZE
L: 1.5 W: 0.04	GRT: LN L: 2.0 W: 2.0

COMMENT
RANDOM CRACK

CORROSION CRACK

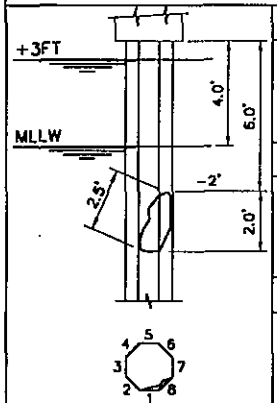


LOCATION
S: – P: 6
C: 1/4
O: LONG

INSP. SIZE	EST. SIZE
L: 5.0 W: 0.5	GRT: AR A: 8.0 D: 3.5

COMMENT
DOUBLE CRACK

CLOSED CORROSION SPALL

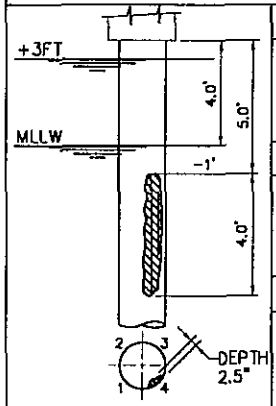


LOCATION
S: 1,8
C: –
P: 6

INSP. SIZE	EST. SIZE
A: 4.0 M: 2.5	GRT: AR A: 5.0 D: 3.0

COMMENT

OPEN COROSION SPALL

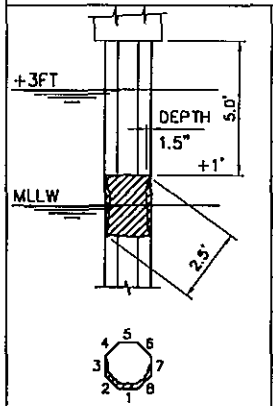


LOCATION
S: 4
C: –
P: 5

INSP. SIZE	EST. SIZE
A: 3.5 D: 2.5 M: 4.0 N: 2	GRT: AR A: 6.0 D: 3.0

COMMENT
REMAINING REBAR DIA. (LONG. BARS) : 0.50 IN.

EROSION

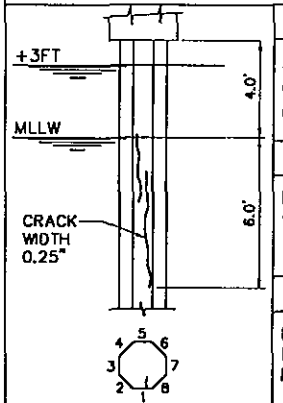


LOCATION
S: 7-3
C: –
P: 5

INSP. SIZE	EST. SIZE
A: 7.5 D: 1.5 M: 2.5	GRT: EN L: 4.0

COMMENT
NO REBARS EXPOSED

UNDERWATER CRACK



LOCATION
S: 1 P: 4
C: –
O: LONG

INSP. SIZE	EST. SIZE
L: 6.0 W: 0.25	

COMMENT
ENGINEERING INVESTIGATION REQUIRED

EXHIBIT D
REGULAR ABOVE WATER INSPECTION WORKSHEET

PILES

BERTH NUMBER(S): _____ BENT NOS: _____ INSPECTION UNIT: _____

INSP. REQUEST DATE: _____ INSPECTOR: _____ PAGE ____ OF ____

FIELD DATA			PRINCIPAL INSPECTION REQUIREMENT								
			GENERAL							LOCAL	
			INSPECTION UNIT			LIMITED AREA					
DEFECT TYPE	LOCATION OF AFFECTED COMPONENTS	COMMENTS	NUMBER OF COMPONENTS		PERCENT AFFECTED	NUMBER OF COMPONENTS		PERCENT AFFECTED	CRITERIA	CHECK IF SIGNIFICANT LOCALIZED DEFECT(S)	YES / NO
			AFFECTED	TOTAL		AFFECTED	TOTAL				
1	2	3	4	5	6	7	8	9	10	11	12
Breakage									Occurrence *		
Overstressing Crack									Occurrence *		
General Crack									----- (1)		
Corrosion Crack									10% or more of piles affected		
Closed Corrosion Spall									10% or more of piles affected		
Open Corrosion Spall									5% or more of piles affected		
All Types of Corrosion Defects									10% or more of piles affected		
Mechanical Damage									----- (1)		
Pile Built-Up Crack									----- (1)		
Erosion									25% or more of piles affected		
Underwater Crack (Above Water Extension)									5% or 3 piles or more affected		
COMMENTS											

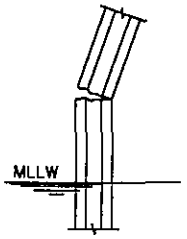
(1) THIS DEFECT WILL GENERALLY NOT REQUIRE A PRINCIPAL INSPECTION.
* A PI IS REQUIRED IF THERE IS AT LEAST ONE OCCURRENCE OF THIS DEFECT.

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

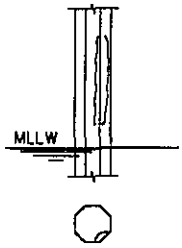
PILES

BREAKAGE



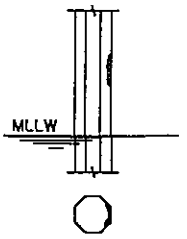
MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE DEFLECTIONS.

CLOSED CORROSION SPALL



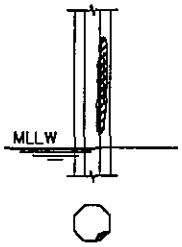
RECESS IN CONCRETE SURFACE CAUSED BY INCOMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. CRACKS ENCIRCLING OR NEARLY ENCIRCLING A FRAGMENT OF CONCRETE INDICATE THAT THE FRAGMENT IS ABOUT TO SPALL OFF.

MECHANICAL DAMAGE



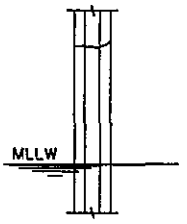
RECESS IN CONCRETE COVER CAUSED BY IMPACT OR CONTINUOUS FRICTION, WITH NO EXPOSED REINFORCING STEEL.

OPEN CORROSION SPALL



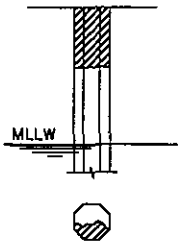
RECESS IN CONCRETE SURFACE CAUSED BY COMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. REINFORCING STEEL IS VISIBLE AND MAY BE COVERED WITH CORROSION PRODUCTS.

OVERSTRESSING CRACK



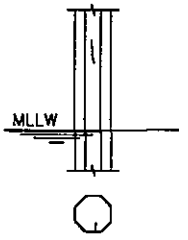
CRACK RESULTING FROM HIGH INTERNAL STRESSES THAT EXCEED STRENGTH OF CONCRETE. OVERSTRESSING CRACKS GENERALLY TEND TO BE CROSS.

PILE/BUILT-UP CRACK



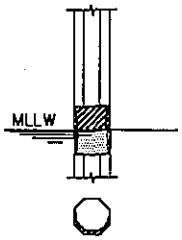
CRACK AT INTERFACE BETWEEN PRECAST PILE AND CAST-IN-PLACE CONCRETE BUILT-UP SECTION. CRACKS ABOVE OR BELOW INTERFACE ARE EITHER OVERSTRESSING, GENERAL, OR CORROSION TYPE.

GENERAL CRACK



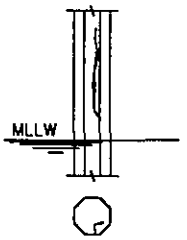
ANY CRACK NOT RESULTING FROM OVERSTRESSING OR CORROSION. APPEARANCE, LOCATION, AND ORIENTATION ARE VARIABLE.

EROSION



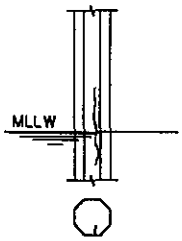
DETERIORATION OF OUTER LAYER OF CONCRETE IN TIDAL ZONE. GENERALLY RESULTS IN ROUNDING OF CORNERS.

CORROSION CRACK



SPLITTING CRACK RESULTING FROM EXPANSION OF CHEMICAL PRODUCTS GENERATED BY CORROSION OF REINFORCING STEEL. CRACKS ARE GENERALLY ORIENTED ALONG REINFORCING STEEL. RED, ORANGE, OR BROWN CORROSION PRODUCTS MAY BE OBSERVED LEACHING FROM CRACK.

UNDERWATER CRACK EXTENSION



TAPERING END OF UNDERWATER CRACK WHICH PROJECTS ABOVE MLLW.

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

RETAINING STRUCTURE

BERTH NUMBER(S): _____ BENT NOS: _____ INSPECTION UNIT: _____

INSP. REQUEST DATE: _____ INSPECTOR: _____ PAGE ___ OF ___

FIELD DATA			PRINCIPAL INSPECTION REQUIREMENT								
			GENERAL							LOCAL	
			INSPECTION UNIT			LIMITED AREA					
DEFECT TYPE	LOCATION OF AFFECTED COMPONENTS	COMMENTS	NUMBER OF COMPONENTS AFFECTED	NUMBER OF COMPONENTS TOTAL	PERCENT AFFECTED	NUMBER OF COMPONENTS AFFECTED	NUMBER OF COMPONENTS TOTAL	PERCENT AFFECTED	CRITERIA	CHECK IF SIGNIFICANT LOCALIZED DEFECT(S)	YES / NO
1	2	3	4	5	6	7	8	9	10	11	12
Breakage									Occurrence *		
Overstressing Crack									Occurrence *		
General Crack									----- (1)		
Corrosion Crack									40% or more of components affected		
Closed Corrosion Spall									40% or more of components affected		
Open Corrosion Spall									25% or more of components affected		
All Types of Corrosion Defects									40% or more of components affected		
Mechanical Damage									----- (1)		
Settlement									3" or greater		
Erosion									25% or more of components affected		
COMMENTS											

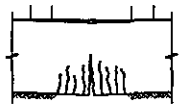
(1) THIS DEFECT WILL GENERALLY NOT REQUIRE A PRINCIPAL INSPECTION.
* A PI IS REQUIRED IF THERE IS AT LEAST ONE OCCURRENCE OF THIS DEFECT.

EXHIBIT D

REGULAR ABOVE WATER INSPECTION WORKSHEET

RETAINING STRUCTURE

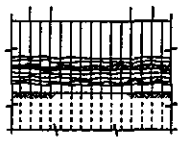
BREAKAGE - GRAVITY WALL



ELEVATION

MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE VERTICAL DEFLECTIONS.

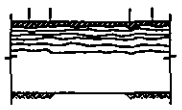
BREAKAGE - SHEET PILING



ELEVATION

MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE LATERAL DEFLECTIONS.

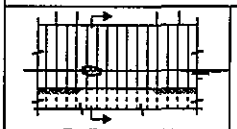
BREAKAGE - CURTAIN WALL



ELEVATION

MAJOR STRUCTURAL DAMAGE AS EVIDENCED BY A SERIES OF LARGE OVERSTRESSING CRACKS WITH WEDGES OF CONCRETE MATERIAL BETWEEN CRACKS SEPARATED, CRUSHED, OR MISSING. TYPICALLY CHARACTERIZED BY LARGE LATERAL DEFLECTIONS.

MECHANICAL DAMAGE

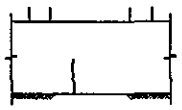


ELEVATION

SECTION

RECESS IN CONCRETE COVER CAUSED BY IMPACT OR CONTINUOUS FRICTION, WITH NO EXPOSED REINFORCING STEEL.

OVERSTRESSING CRACK



ELEVATION

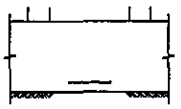
CRACK RESULTING FROM HIGH INTERNAL STRESSES THAT EXCEED STRENGTH OF CONCRETE. OVERSTRESSING CRACKS GENERALLY TEND TO BE CROSS. (NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE)

GENERAL CRACK

ELEVATION

ANY CRACK NOT RESULTING FROM OVERSTRESSING OR CORROSION. APPEARANCE, LOCATION, AND ORIENTATION ARE VARIABLE.

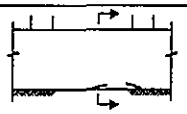
CORROSION CRACK



ELEVATION

SPLITTING CRACK RESULTING FROM EXPANSION OF CHEMICAL PRODUCTS GENERATED BY CORROSION OF REINFORCING STEEL. CRACKS ARE GENERALLY ORIENTED ALONG REINFORCING STEEL. RED, ORANGE, OR BROWN CORROSION PRODUCTS MAY BE OBSERVED LEACHING FROM CRACK.

CLOSED CORROSION SPALL

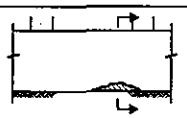


ELEVATION

SECTION

RECESS IN CONCRETE SURFACE CAUSED BY INCOMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. CRACKS ENCIRCLING OR NEARLY ENCIRCLING A FRAGMENT OF CONCRETE INDICATE THAT THE FRAGMENT IS ABOUT TO SPALL OFF.

OPEN CORROSION SPALL

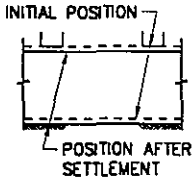


ELEVATION

SECTION

RECESS IN CONCRETE SURFACE CAUSED BY COMPLETE SEPARATION OF CONCRETE COVER RESULTING FROM CORROSION CRACKING. REINFORCING STEEL IS VISIBLE AND MAY BE COVERED WITH CORROSION PRODUCTS.

SETTLEMENT



ELEVATION

DOWNWARD MOVEMENT CAUSED BY CONSOLIDATION OF UNDERLYING SOIL AND/OR EROSION OF SLOPE.

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

EXHIBIT D

REGULAR UNDERWATER INSPECTION FIELD FORM

PRESTRESSED PILES

BERTH NO(S): _____ BENT NOS: _____ INSPECTION UNIT: _____

INSP. REQUEST DATE: _____ INSPECTOR: _____ PAGE ____ OF ____

PILE ID / DEFECT	LOCATION OF COMPONENT DEFECT	SIZE OF COMPONENT DEFECT	INCLUDED IN PI EVALUATION (YES/NO)

NOTE: PRINCIPAL INSPECTION IS REQUIRED IF THE FOLLOWING CONDITIONS ARE ENCOUNTERED DURING REGULAR UNDERWATER INSPECTION:

a) Occurrence of breakage or overstressing crack.
b) Occurrence of corrosion crack, closed corrosion spall, or open corrosion spall.
c) Erosion on 10 percent or more of inspected piles.
d) Occurrence of underwater cracks.

EXHIBIT D

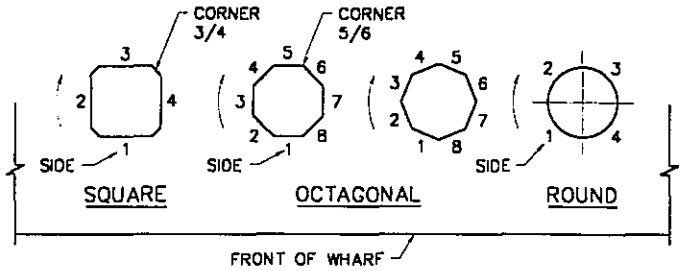
PRESTRESSED PILES UNDERWATER

S - SIDE
C - CORNER
XX - DEFECT APPEARS ON ALL SIDES OR CORNERS

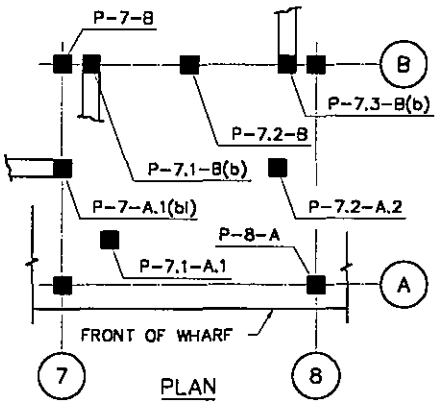
O - CRACK ORIENTATION
LONG - LONGITUDINAL
CROSS - CROSS
DIAG - DIAGONAL

A - AREA (SF)
D - DEPTH (IN.)
L - LENGTH (FT)
M - MAXIMUM DIMENSION (FT)
W - CRACK WIDTH (IN.)

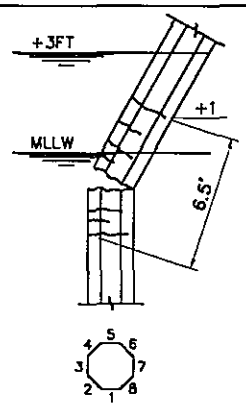
P - POSITION/BAND
TOP - TOP
MID - MIDDLE
BOT - BOTTOM



DEFECT LOCATION KEY

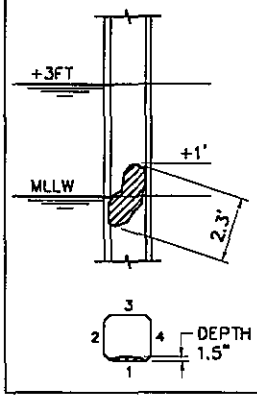


BREAKAGE



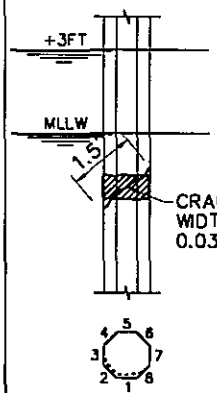
LOCATION
S: XX C: – P: TOP
SIZE
M: 6.5 D: 18.0
COMMENT

MECHANICAL DAMAGE



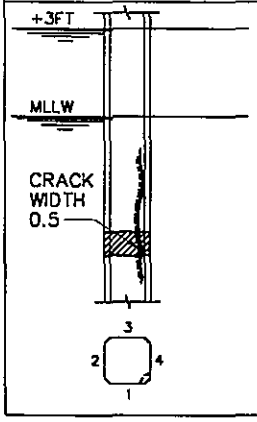
LOCATION
S: 1 C: – P: TOP
SIZE
A: 3.5 D: 1.5 M: 2.3
COMMENT

GENERAL/OVERSTR. CRACK



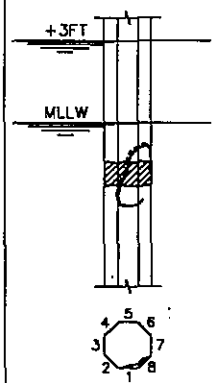
LOCATION
S: 8-3 P: TOP C: – O: DIAG
SIZE
L: 1.5 W: 0.03
COMMENT
RANDOM CRACK

CORROSION CRACK



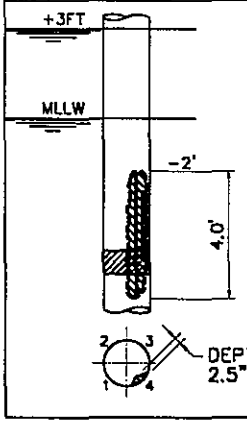
LOCATION
S: – P: MID C: 1/4 O: LONG
SIZE
L: 5.0 W: 0.5
COMMENT
DOUBLE CRACK

CLOSED CORROSION SPALL



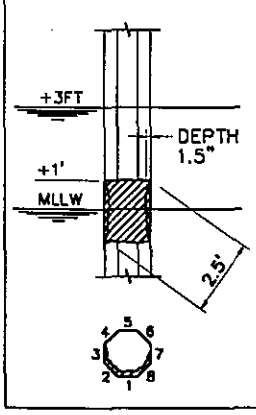
LOCATION
S: 1,8 C: – P: TOP
SIZE
A: 5.0 M: 2.5
COMMENT

OPEN CORROSION SPALL



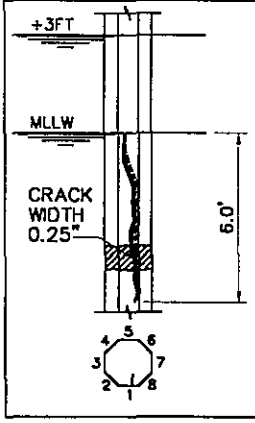
LOCATION
S: 4 C: – P: MID
SIZE
A: 3.5 N: 2 D: 2.5 M: 4.0
COMMENT
REMAINING REBAR DIA. (LONG. BARS) 0.75 IN.

EROSION



LOCATION
S: 7-3 C: – P: TOP
SIZE
A: 7.5 D: 1.5 M: 2.5
COMMENT
NO REBARS EXPOSED

UNDERWATER CRACK



LOCATION
S: 1 P: MID C: – O: LONG
SIZE
L: 6.0 W: 0.25
COMMENT

NOTE: DEFECTS DEPICTED ARE NOT ALL INCLUSIVE REGARDING LOCATION AND DIRECTION.

EXHIBIT D

REGULAR UNDERWATER INSPECTION FIELD FORM

RETAINING STRUCTURE

BERTH NO(S): _____ BENT NOS: _____ INSPECTION UNIT: _____

INSP. REQUEST DATE: _____ INSPECTOR: _____ PAGE____OF____.

COMPONENT ID / DEFECT	LOCATION OF COMPONENT DEFECT	SIZE OF COMPONENT DEFECT	INCLUDED IN PI EVALUATION (YES/NO)

NOTE: PRINCIPAL INSPECTION IS REQUIRED IF THE FOLLOWING CONDITIONS ARE ENCOUNTERED DURING REGULAR UNDERWATER INSPECTION:

a) Occurrence of breakage or overstressing crack.
b) Occurrence of corrosion crack, closed corrosion spall, or open corrosion spall on prestressed components; corrosion cracks, closed corrosion spalls, open corrosion spalls, or a combination thereof on 20 percent or more of inspected components, or on at least 3 components for non-prestressed components.
c) Erosion on 10 percent or more of inspected components for prestressed; 25 percent for non-prestressed components.
d) Occurrence of underwater cracks on prestressed components; underwater cracks on 20 percent or more of inspected components, or on at least 3 components, on non-prestressed components.
e) Settlement of 3" or greater of inspected components.

EXHIBIT D

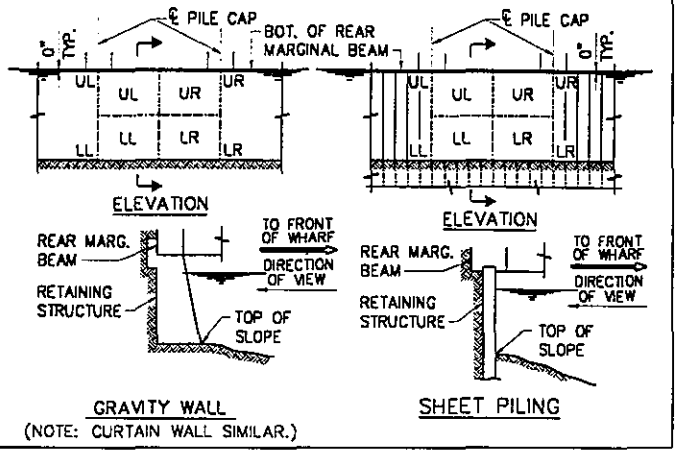
RETAINING STRUCTURE UNDERWATER

Q - QUADRANTS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT
- XX - DEFECT APPEARS IN ALL QUADRANTS

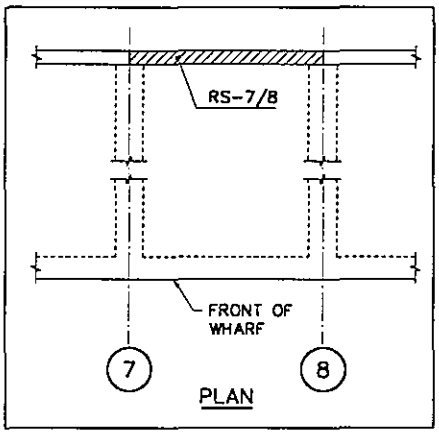
C - CORNERS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT

O - CRACK ORIENTATION
- LONG - LONGITUDINAL
- CROSS - CROSS
- DIAG - DIAGONAL

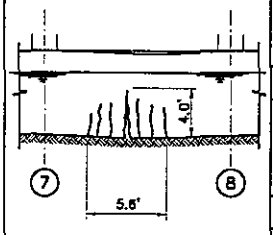
- A - AREA (SF)
- L - LENGTH (FT)
- D - DEPTH (IN.)
- M - MAX. DIMENSION (FT)
- W - CRACK WIDTH AND EST. WIDTH OF REPAIR (IN.)
- N - NUMBER OF EXPOSED REBARS
- T - SETTLEMENT (IN.)



(NOTE: CURTAIN WALL SIMILAR.)

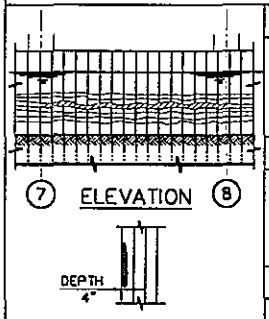


BREAKAGE - GRAVITY WALL



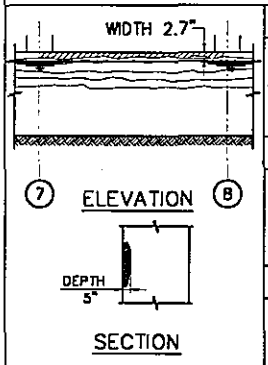
LOCATION	INSP. SIZE	COMMENT
Q: LL,LR	M: 5.6 D: 48.0	REBARS BROKEN ENGR. INVESTI-GATION REQ'D.

BREAKAGE - SHEET PILING



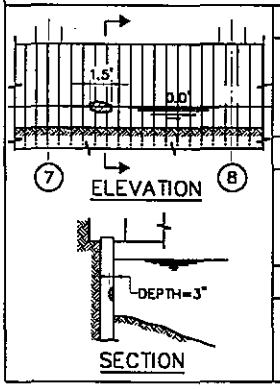
LOCATION	INSP. SIZE	COMMENT
Q: LL,LR	M: 15.0 D: 4.0	CONTINUOUS THROUGH RS-7/8

BREAKAGE - CURTAIN WALL



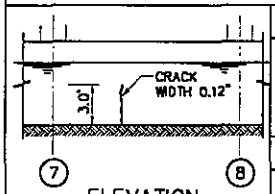
LOCATION	INSP. SIZE	COMMENT
Q: LL,LR	M: 15.0 D: 5.0	CONTINUOUS THROUGH RS-7/8

MECHANICAL DAMAGE



LOCATION	INSP. SIZE	COMMENT
Q: LL	A: 3.0 O: 3.0 M: 1.5	

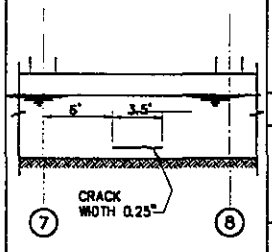
GENERAL/OVERSTR. CRACK



NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE

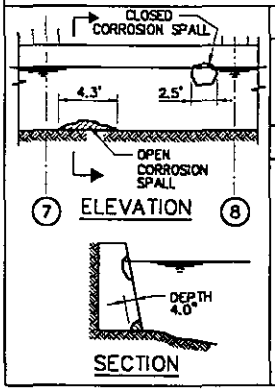
LOCATION	INSP. SIZE	COMMENT
Q: LL O: CROSS	L: 3.0 W: 0.12	VERTICAL OVERSTR.

CORROSION CRACK



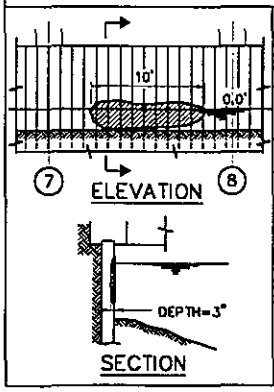
LOCATION	INSP. SIZE	COMMENT
Q: LL,LR O: LONG	L: 3.5 W: 0.25	

CORROSION SPALL



LOCATION		INSP. SIZE	
(OPEN)	(CLOSED)	(OPEN)	(CLOSED)
Q: LL	Q: UR	A: 7.5	A: 3.6
		M: 4.3	M: 2.5
		D: 4.0	
		N: 4	

EROSION



LOCATION	INSP. SIZE	COMMENT
Q: LL, LR	A: 20.0 M: 10.0 D: 3.0	CONTINUOUS LOSS OF CONCRETE COVER

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EXHIBIT D

PRINCIPAL INSPECTION FIELD FORM

PILES
ABOVE WATER
PAGE ___ OF ___

BERTH NOS: ______________ INSP. REQUEST DATE: ______ INSPECTION UNIT: ______________
BENT NOS: ______________ DATE OF INSPECTION: ______ INSPECTOR: ______________

COMPONENT ID / DEFECT TYPE	EXISTING DEFECT						ESTIMATED REPAIR PARAMETERS		
	LOCATION	SIZE	PREV. REPAIR	REPAIR PRIORITY	PS	UW	GENERAL REPAIR TYPE (GRT)	SIZE OF REPAIR	SPECIFIED REPAIR METHOD (SRM)
			COMMENT						

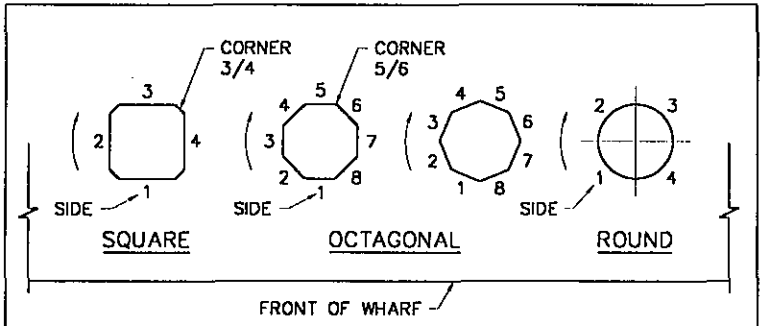
NOTES:
Prev. Repairs - Check "X" if defect was previously repaired
Repair Priority - Check "EM" - Emergency, "PR" - Priority, "MT" - Maintenance, "IN" - To Be Investigated
PS - Check "X" if defect may cause damage to prestressing reinforcement
UW - Check "X" if defect is underwater or below EL +3.0 ft MLLW

EXHIBIT D

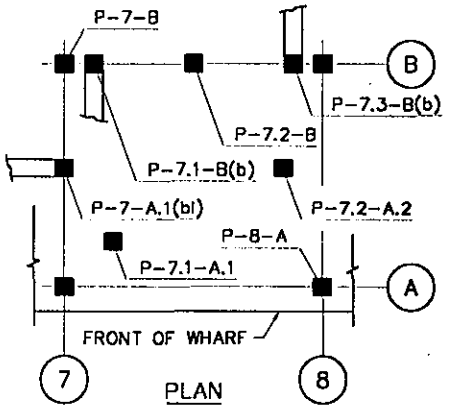
PRESTRESSED / NON-PRESTRESSED PILES - ABOVE WATER

S – SIDE
C – CORNER
XX – DEFECT APPEARS ON ALL SIDES OR CORNERS
P – POSITION (DISTANCE FROM TOP OF PILE, FT)
O – CRACK ORIENTATION
LONG – LONGITUDINAL
CROSS – CROSS
DIAG – DIAGONAL

A – AREA (SF)
D – DEPTH (IN.)
L – LENGTH (FT)
M – MAXIMUM DIMENSION (FT)
N – NO. OF EXPOSED REBARS
W – CRACK WIDTH AND EST. WIDTH OF REPAIR
GRT – GENERAL REPAIR TYPE
LN – LINEAL
AR – AREAL
EN – ENCASEMENT
TDB – TO BE DETERMINED

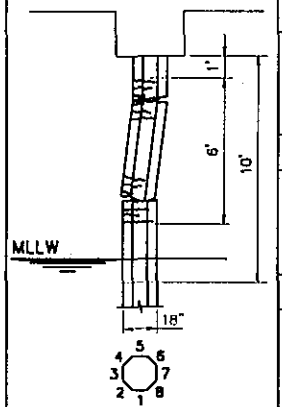


DEFECT LOCATION KEY



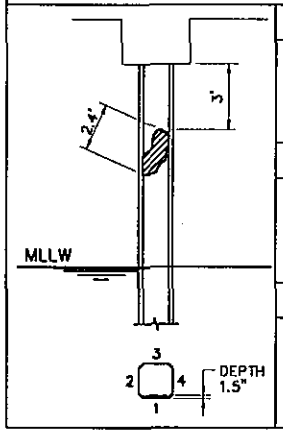
PLAN

BREAKAGE



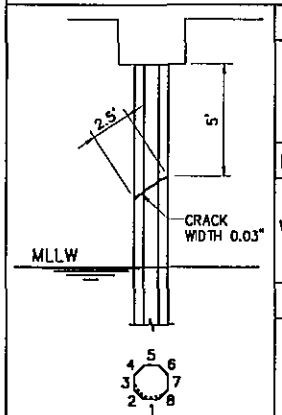
LOCATION	
S: XX	P: 1
C: –	
INSP. SIZE	EST. SIZE
M: 6.0 D: 18.0	GRT: EN L: 10.0
COMMENT	
DOUBLE BREAKAGE	

MECHANICAL DAMAGE



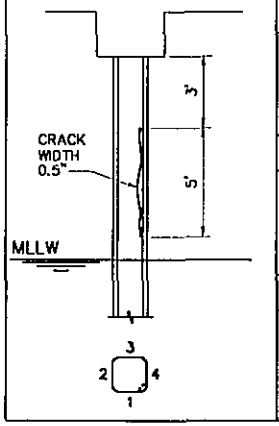
LOCATION	
S: 1	
C: –	
P: 3	
INSP. SIZE	EST. SIZE
A: 3.0 D: 1.5 M: 2.4	GRT: AR A: 3.0 D: 2.0
COMMENT	
SIDE SPALL	

GENERAL/OVERSTR. CRACK



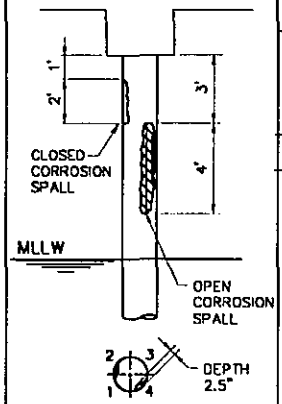
LOCATION	
S: 8-3	P: 5
C: –	
O: DIAG	
INSP. SIZE	EST. SIZE
L: 2.5 W: 0.04	GRT: LN L: 2.5 W: 2.0
COMMENT	
RANDOM CRACK	

CORROSION CRACK



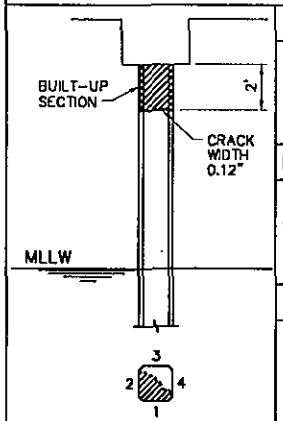
LOCATION	
S: –	P: 3
C: 1/4	
O: LONG	
INSP. SIZE	EST. SIZE
L: 5.0 W: 0.5	GRT: AR A: 5.0 D: 4.5
COMMENT	
DOUBLE CRACK	

CORROSION SPALL



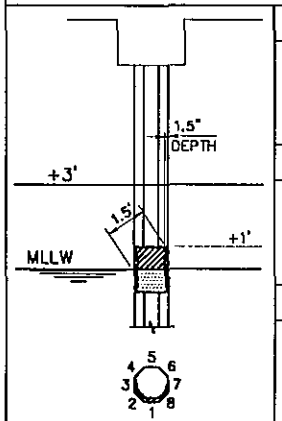
LOCATION	
(OPEN)	(CLOSED)
S: 4 C: – P: 3	S: 1,2 C: – P: 1
INSP. SIZE	EST. SIZE
(OPEN) A: 3.5 D: 2.5 M: 4.0 N: 2.0 (CLOSED) A: 2.5 M: 2.0	(OPEN) GRT: AR A: 5.0 D: 4.5 (CLOSED) GRT: AR A: 3.0 D: 4.5

PILE/BUILT-UP CRACK



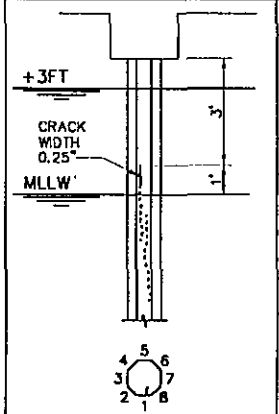
LOCATION	
S: 1,2,4	P: 2
C: –	
O: CROSS	
INSP. SIZE	EST. SIZE
L: 2.0 W: 0.12	GRT: LN L: 2.0 W: 5.0
COMMENT	

EROSION



LOCATION	
S: 7-3	
C: –	
P: 2	
INSP. SIZE	EST. SIZE
A: 3.5 D: 1.5 M: 1.5	GRT: EN L: 3.0
COMMENT	
NO REBARS EXPOSED UNDERWATER DEFECT	

UNDERWATER CRACK



LOCATION	
S: 1	P: 3
C: –	
O: LONG	
INSP. SIZE	EST. SIZE
L: 1.0 W: 0.25	
COMMENT	
ABOVE WATER EXTENSION UNDERWATER DEFECT	

EXHIBIT D

PRINCIPAL INSPECTION FIELD FORM

RETAINING STRUCTURE ABOVE WATER

BERTH NOS: _____ INSP. REQUEST DATE: _____ INSPECTION UNIT: _____

BENT NOS: _____ DATE OF INSPECTION: _____ INSPECTOR: _____ PAGE ____ OF ____

COMPONENT ID / DEFECT TYPE	EXISTING DEFECT						ESTIMATED REPAIR PARAMETERS		
	LOCATION	SIZE	PREV. REPAIR	REPAIR PRIORITY	PS	UW	GENERAL REPAIR TYPE (GRT)	SIZE OF REPAIR	SPECIFIED REPAIR METHOD (SRM)
			COMMENT						

NOTES:

Prev. Repairs - Check "X" if defect was previously repaired

Repair Priority - Check "EM" - Emergency, "PR" - Priority, "MT" - Maintenance, "IN" - To Be Investigated

PS - Check "X" if defect may cause damage to prestressing reinforcement

UW - Check "X" if defect is underwater or below EL +3.0 ft MLLW

EXHIBIT D

RETAINING STRUCTURE ABOVE WATER

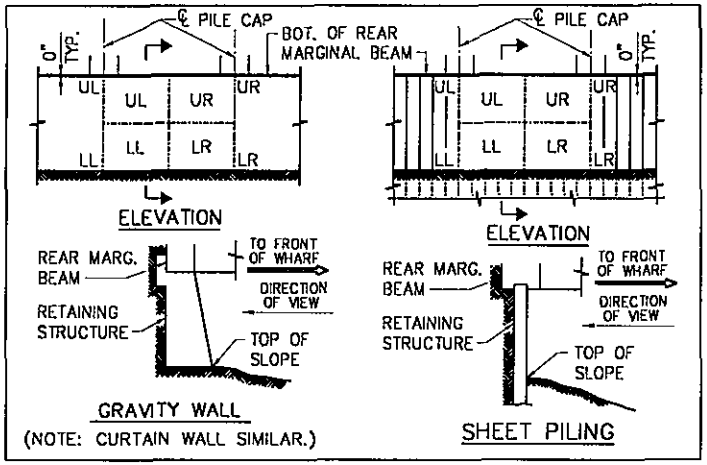
Q - QUADRANTS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- ldx = LOWER LEFT DEFECT APPEARS IN ALL QUADRANTS

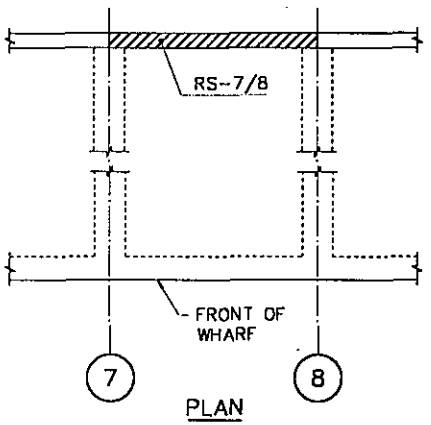
C - CORNERS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT

O - CRACK ORIENTATION
- LONG - LONGITUDINAL
- CROSS - CROSS
- DIAG - DIAGONAL

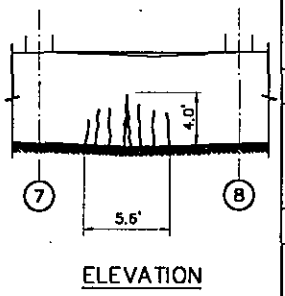
- A - AREA (SF)
- L - LENGTH (FT)
- D - DEPTH (IN.)
- M - MAX. DIMENSION (FT)
- W - CRACK WIDTH AND EST. WIDTH OF REPAIR (IN.)
- N - NUMBER OF EXPOSED REBARS
- T - SETTLEMENT (IN.)

GRT - GENERAL REPAIR TYPE
- LN - LINEAL
- AR - AREAL
- EN - ENCASEMENT
- TBD - TO BE DETERMINED



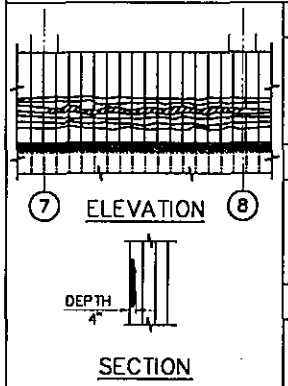


BREAKAGE - GRAVITY WALL



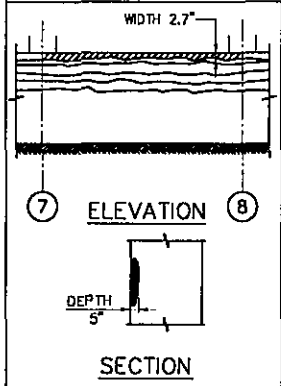
LOCATION	
Q: LL,LR	
INSP. SIZE	EST. SIZE
M: 5.6 D: 48	
COMMENT	
REBARS BROKEN ENGR. INVESTI-GATION REQ'D.	

BREAKAGE - SHEET PILING



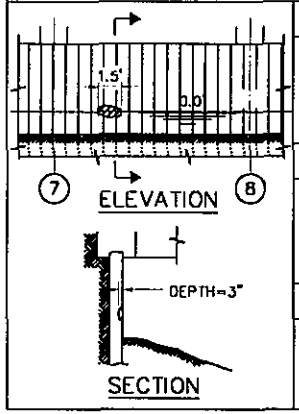
LOCATION	
Q: LL,LR	
INSP. SIZE	EST. SIZE
M: 15.0 D: 4.0	R: AR A: 40.0 D: 5.0
COMMENT	
CONTINUOUS THROUGH RS-7/8	

BREAKAGE - CURTAIN WALL



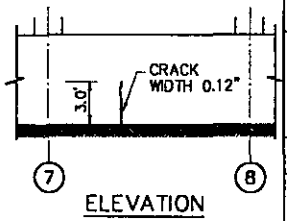
LOCATION	
Q: LL,LR	
INSP. SIZE	EST. SIZE
M: 15.0 D: 5.0	R: AR A: 50.0 D: 7.0
COMMENT	
CONTINUOUS THROUGH RS-7/8	

MECHANICAL DAMAGE



LOCATION	
Q: LL	
INSP. SIZE	EST. SIZE
A: 3.0 D: 3.0 M: 1.5	GRT: AR A: 4.0 D: 4.0
COMMENT	

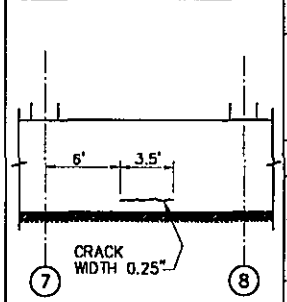
GENERAL/OVERSTR. CRACK



NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE

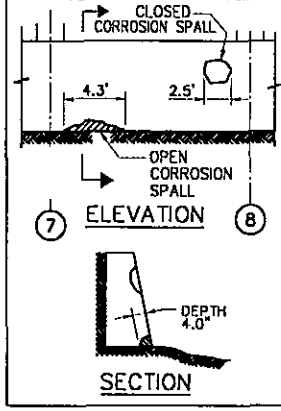
LOCATION	
Q: LL O: CROSS	
INSP. SIZE	EST. SIZE
L: 3.0 W: 0.12	GRT: LN L: 4.0 W: 5.0
COMMENT	
VERTICAL OVERSTR.	

CORROSION CRACK



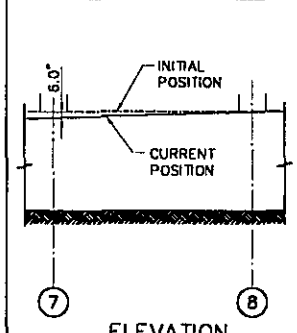
LOCATION	
Q: LL,LR O: LONG	
INSP. SIZE	EST. SIZE
L: 3.5 W: 0.25	GRT: AR A: 5.0 D: 4.0
COMMENT	

CORROSION SPALL



LOCATION	
(OPEN) Q: LL	(CLOSED) Q: UR
INSP. SIZE	EST. SIZE
(OPEN) A: 7.5 M: 4.3 D: 4.0 N: 4 (CLOSED) A: 3.6 M: 2.5	(OPEN) GRT: AR A: 10.0 D: 5.0 (CLOSED) GRT: AR A: 5.0 D: 4.5

SETTLEMENT



LOCATION	
C: UL	
INSP. SIZE	EST. SIZE
T: 6.0	
COMMENT	

EXHIBIT D

PRINCIPAL INSPECTION FIELD FORM

RETAINING STRUCTURE
UNDERWATER

BERTH NOS: ________ INSP. REQUEST DATE: ________ INSPECTION UNIT: ________

BENT NOS: ________ DATE OF INSPECTION: ________ INSPECTOR: ________

PAGE ____ OF ____

COMPONENT ID / DEFECT TYPE	EXISTING DEFECT						ESTIMATED REPAIR PARAMETERS		
	LOCATION	SIZE	PREV. REPAIR	REPAIR PRIORITY	PS	UW	GENERAL REPAIR TYPE (GRT)	SIZE OF REPAIR	SPECIFIED REPAIR METHOD (SRM)
			COMMENT						

NOTES:

Prev. Repairs - Check "X" if defect was previously repaired

Repair Priority - Check "EM" - Emergency, "PR" - Priority, "MT" - Maintenance, "IN" - To Be Investigated

PS - Check "X" if defect may cause damage to prestressing reinforcement

UW - Check "X" if defect is underwater or below EL +3.0 ft MLLW

EXHIBIT D

RETAINING STRUCTURE UNDERWATER

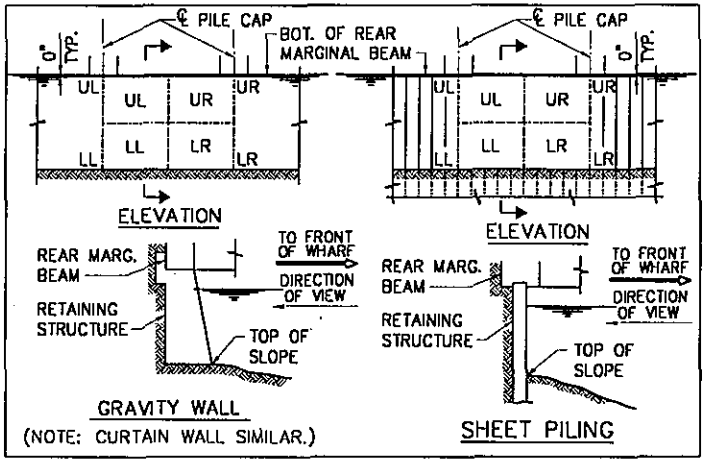
Q - QUADRANTS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT
- XX - DEFECT APPEARS IN ALL QUADRANTS

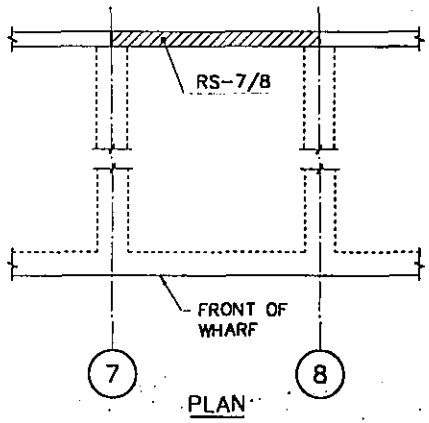
C - CORNERS:
- UR - UPPER RIGHT
- LR - LOWER RIGHT
- UL - UPPER LEFT
- LL - LOWER LEFT

O - CRACK ORIENTATION
- LONG - LONGITUDINAL
- CROSS - CROSS
- DIAG - DIAGONAL

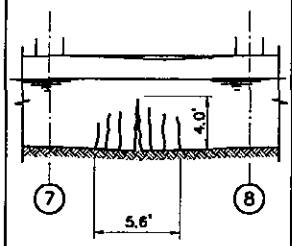
- A - AREA (SF)
- L - LENGTH (FT)
- D - DEPTH (IN.)
- M - MAX. DIMENSION (FT)
- W - CRACK WIDTH AND EST. WIDTH OF REPAIR (IN.)
- N - NUMBER OF EXPOSED REBARS
- T - SETTLEMENT (IN.)

GRT - GENERAL REPAIR TYPE
- LN - LINEAL
- AR - AREAL
- EN - ENCASEMENT
- TBD - TO BE DETERMINED





BREAKAGE - GRAVITY WALL

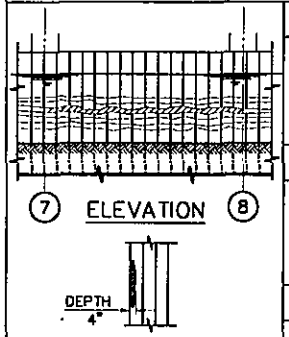


LOCATION: Q: LL,LR

INSP. SIZE	EST. SIZE
M: 5.6 D: 48	

COMMENT: REBARS BROKEN ENGR. INVESTIGATION REQ'D.

BREAKAGE - SHEET PILING

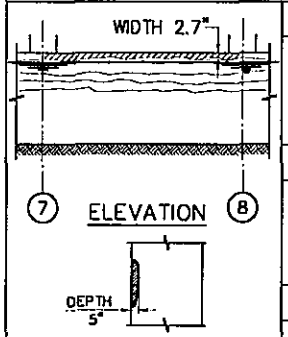


LOCATION: Q: LL,LR

INSP. SIZE	EST. SIZE
M: 15.0 D: 4.0	R: AR A: 40.0 D: 5.0

COMMENT: CONTINUOUS THROUGH RS-7/8

BREAKAGE - CURTAIN WALL

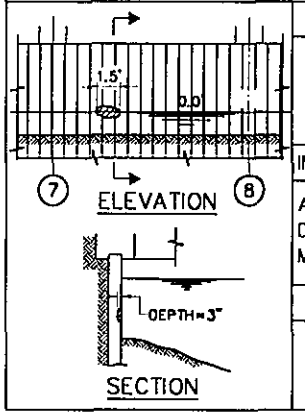


LOCATION: Q: LL,LR

INSP. SIZE	EST. SIZE
M: 15.0 D: 5.0	R: AR A: 50.0 D: 7.0

COMMENT: CONTINUOUS THROUGH RS-7/8

MECHANICAL DAMAGE

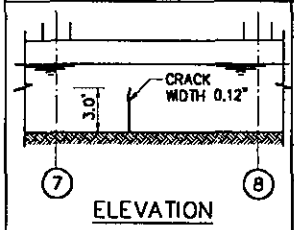


LOCATION: Q: LL

INSP. SIZE	EST. SIZE
A: 3.0 D: 3.0 M: 1.5	GRT: AR A: 4.0 D: 4.0

COMMENT:

GENERAL/OVERSTR. CRACK



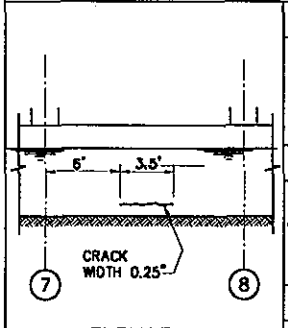
NOTE: GRAVITY WALL SHOWN; OVERSTRESSING CRACKS FOR SHEET PILING AND CURTAIN WALL WILL BE HORIZONTAL, AS SHOWN FOR BREAKAGE

LOCATION: Q: LL; O: CROSS

INSP. SIZE	EST. SIZE
L: 3.0 W: 0.12	GRT: LN L: 4.0 W: 5.0

COMMENT: VERTICAL OVERSTR.

CORROSION CRACK

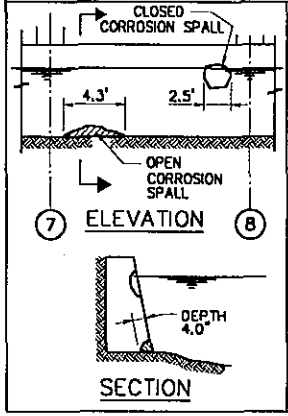


LOCATION: Q: LL,LR; O: LONG

INSP. SIZE	EST. SIZE
L: 3.5 W: 0.25	GRT: AR A: 5.0 D: 4.0

COMMENT:

CORROSION SPALL

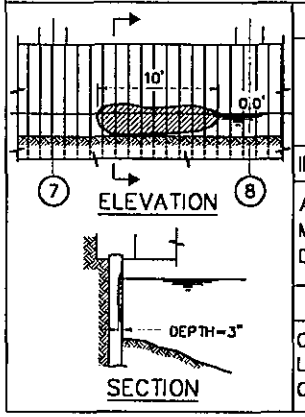


LOCATION:

(OPEN)	(CLOSED)
Q: LL	Q: UR

INSP. SIZE	EST. SIZE
(OPEN) A: 7.5 M: 4.3 D: 4.0 N: 4 (CLOSED) A: 3.6 M: 2.5	(OPEN) GRT: AR A: 10.0 D: 5.0 (CLOSED) GRT: AR A: 5.0 D: 4.5

EROSION



LOCATION: Q: LL, LR

INSP. SIZE	EST. SIZE
A: 20.0 M: 10.0 D: 3.0	GRT: AR A: 25.0 D: 3.0

COMMENT: CONTINUOUS LOSS OF CONCRETE COVER

600-29\Inspection Manual\Forms\Form34A.dwg

EXHIBIT E
FACILITY OPERATIONS ON PAVED AREAS*

(*Note that facilities covered by an Individual or Industrial NPDES permit, or designated as a Critical Source in the Municipal NPDES permit, will also have to comply with all permit requirements)

ENVIRONMENTAL PERMIT CONDITIONS:

1. Facility shall be cleaned and maintained regularly. All areas shall be swept at least once per week or as needed to control trash, debris, and other waste.

2. Whenever feasible, dry cleaning methods shall be used instead of washing down. If an area must be washed, spot clean to minimize the amount of water used. All wash water shall be contained; only stormwater shall be allowed to enter the storm drain system. For large areas, contain the wash water by vacuum truck or discharge to the sewer system via a permitted connection. Prior to washing, the Permittee shall: o Seal off storm drains using temporary berms or covers. o Sweep the area that is to be cleaned and dispose of trash and debris as solid waste.

3. Sweepings and/ or sediment shall not be allowed to enter the storm drains or leave the property.

4. Facility shall be inspected weekly to ensure that no drips, leaks and spills are occurring on site. Drip pans and spill equipment shall be available onsite for emergencies. Drip pans shall be deployed at the first sign of a leak or drip, and repairs shall be made immediately. Following any release, areas shall be cleaned up immediately using dry cleaning methods.

5. Do not feed birds, feral cats, sea lions, or other scavengers.

6. All hazardous, universal, and non- hazardous wastes and materials in drums shall be stored in designated areas on spill pallets, in leak- proof, covered, and labeled containers.

7. Small quantity liquid products (such as paints, lubricants, aerosol cans) shall be stored indoors and/ or in flammable lockers.

8. Parts, equipment, or materials with metal particulate, rust, grease, and/ or oil shall be stored indoors, or if outdoors then elevated off the ground and covered.

9. Dumpsters, recycle bins and trash containers shall have lids that are kept closed. Leaking dumpsters and bins shall be replaced immediately.

10. No equipment or vehicle washing, repair or maintenance is allowed on site.

11. No fueling operations are allowed on site.

EXHIBIT E

AMP FOR COMMERCIAL HARBOR CRAFT

ENVIRONMENTAL PERMIT CONDITIONS:

1. Alternative Maritime Power for Commercial Harbor Craft. Starting on the Effective Date of the permit, the Tenant must evaluate whether Alternative Maritime Power (AMP) (also known as shore-based dock power) is feasible to implement during operations at the premises. The tenant must submit a written report within 6 months detailing whether AMP is feasible based on, but not limited to, operational, technical, and financial criteria as described below.

    a. Availability of an AMP-capable Berth and AMP infrastructure that can be constructed and operated at the premises.
    b. Availability of AMP-capable vessel(s) or ability to retrofit existing vessel(s).
        i. Fitting a vessel with AMP requires the following components:
            1. A cable system to connect to the dock power connection point at a terminal;
            2. A connection system to safely relay the power to the vessel; and
            3. The power system at the facility that has sufficient capacity to supply the power needed by the vessel.
    c. Cost
        i. For purposes of the feasibility evaluation, “Cost Effectiveness” shall include without limitation, 1) all capital costs associated with design, permitting and construction of AMP and all costs associated with operations and maintenance, and 2) all costs associated with purchasing and/or retrofitting AMP-capable vessel(s). Cost Effectiveness (dollars per ton) may be calculated pursuant to the formulas below based on Carl Moyer Program Guidelines:
            1. Cost Effectiveness ($/ton) = Annualized Cost ($/year) / Net Annual Emission Reductions (tons/year)
            2. Net Annual Emission Reductions = Annual Vessel Emission Reductions – Annual Emissions Generated by Control System and Associated Equipment Operations
        ii. If Cost Effectiveness is greater than the Carl Moyer Program Guidelines, as approved by the California Air Resources Board as of the Effective Date, then implementation of AMP shall not be considered feasible.

    Tenant shall submit written report to:

    Chris Cannon, Director
    Port of Los Angeles
    Environmental Management Division
    425 S. Palos Verdes Street
    San Pedro, CA 90731
    Attn: Compliance Coordinator

    Email to: Lisa Ochsner, Marine Environmental Manager (LOchsner@portla.org)

2. The Port's Environmental Management Division shall have four weeks to review and comment on the written report unless it is determined that additional time is needed.

3. If AMP is considered feasible based on the findings of the report, the Tenant shall, as soon as reasonably practicable after such determination, implement AMP into its operations throughout the remainder of the permit. All vessels owned and/or operated by the Tenant thereafter must use AMP while hoteling in the Port of Los Angeles. Additionally, the Tenant shall provide verification documents with detailed AMP usage and vessel data every 6 months to the Port's Environmental Management Division.

12/2/2020

EXHIBIT E

Site Specific Permit Conditions – APP # 201020-164

1. American Marine Corporation shall update their Stormwater Pollution Prevention Plan (SWPPP) and associated requirements in compliance with the Industrial Stormwater General Permit Order number 2014-0057-DWQ to reflect the changes in the premises.

EXHIBIT F

AFFIRMATIVE ACTION PROGRAM PROVISIONS

Sec. 10.8.4 Affirmative Action Program Provisions.

Every non-construction contract with or on behalf of the City of Los Angeles for which the consideration is $100,000 or more and every construction contract with or on behalf of the City of Los Angeles for which the consideration is $5,000 or more shall contain the following provisions which shall be designated as the AFFIRMATIVE ACTION PROGRAM provisions of such contract:

A. During the performance of City contract, the contractor certifies and represents that the contractor and each subcontractor hereunder will adhere to an affirmative action program to ensure that in its employment practices, persons are employed and employees are treated equally and without regard to or because of race, religion, ancestry, national origin, sex, sexual orientation, age, disability, marital status, domestic partner status, or medical condition.

1. This provision applies to work or services performed or materials manufactured or assembled in the United States.

2. Nothing in this section shall require or prohibit the establishment of new classifications of employees in any given craft, work or service category.

3. The contractor shall post a copy of Paragraph A hereof in conspicuous places at its place of business available to employees and applicants for employment.

B. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to their race, religion, ancestry, national origin, sex, sexual orientation, age, disability, marital status, domestic partner status, or medical condition.

C. As part of the City's supplier registration process, and/or at the request of the awarding authority or the Office of Contract Compliance, the contractor shall certify on an electronic or hard copy form to be supplied, that the contractor has not discriminated in the performance of City contracts against any employee or applicant for employment on the basis or because of race, religion, ancestry, national origin, sex, sexual orientation, age, disability, marital status, domestic partner status, or medical condition.

D. The contractor shall permit access to and may be required to provide certified copies of all of its records pertaining to employment and to its employment practices by the awarding authority or the Office of Contract

Compliance, for the purpose of investigation to ascertain compliance with the Affirmative Action Program provisions of City contracts, and on their or either of their request to provide evidence that it has or will comply therewith.

E. The failure of any contractor to comply with the Affirmative Action Program provisions of City contracts may be deemed to be a material breach of contract. Such failure shall only be established upon a finding to that effect by the awarding authority, on the basis of its own investigation or that of the Board of Public Works, Office of Contract Compliance. No such finding shall be made except upon a full and fair hearing after notice and an opportunity to be heard has been given to the contractor.

F. Upon a finding duly made that the contractor has breached the Affirmative Action Program provisions of a City contract, the contract may be forthwith cancelled, terminated or suspended, in whole or in part, by the awarding authority, and all monies due or to become due hereunder may be forwarded to and retained by the City of Los Angeles. In addition thereto, such breach may be the basis for a determination by the awarding authority or the Board of Public Works that the said contractor is an irresponsible bidder or proposer pursuant to the provisions of Section 371 of the Los Angeles City Charter. In the event of such determination, such contractor shall be disqualified from being awarded a contract with the City of Los Angeles for a period of two years, or until he or she shall establish and carry out a program in conformance with the provisions hereof.

G. In the event of a finding by the Fair Employment and Housing Commission of the State of California, or the Board of Public Works of the City of Los Angeles, or any court of competent jurisdiction, that the contractor has been guilty of a willful violation of the California Fair Employment and Housing Act, or the Affirmative Action Program provisions of a City contract, there may be deducted from the amount payable to the contractor by the City of Los Angeles under the contract, a penalty of TEN DOLLARS ($10.00) for each person for each calendar day on which such person was discriminated against in violation of the provisions of a City contract.

H. Notwithstanding any other provisions of a City contract, the City of Los Angeles shall have any and all other remedies at law or in equity for any breach hereof.

I. The Public Works Board of Commissioners shall promulgate rules and regulations through the Office of Contract Compliance and provide to the awarding authorities electronic and hard copy forms for the implementation of the Affirmative Action Program provisions of City contracts, and rules and regulations and forms shall, so far as practicable, be similar to those adopted in applicable Federal Executive Orders. No other rules, regulations or forms may be used by an awarding authority of the City to accomplish this contract compliance program.

J. Nothing contained in City contracts shall be construed in any manner so as to require or permit any act which is prohibited by law.

K. The Contractor shall submit an Affirmative Action Plan which shall meet the requirements of this chapter at the time it submits its bid or proposal or at the time it registers to do business with the City. The plan shall be subject to approval by the Office of Contract Compliance prior to award of the contract. The awarding authority may also require contractors and suppliers to take part in a pre-registration, pre-bid, pre-proposal, or pre-award conference in order to develop, improve or implement a qualifying Affirmative Action Plan. Affirmative Action Programs developed pursuant to this section shall be effective for a period of twelve

months from the date of approval by the Office of Contract Compliance. In case of prior submission of a plan, the contractor may submit documentation that it has an Affirmative Action Plan approved by the Office of Contract Compliance within the previous twelve months. If the approval is 30 days or less from expiration, the contractor must submit a new Plan to the Office of Contract Compliance and that Plan must be approved before the contract is awarded.

1. Every contract of $5,000 or more which may provide construction, demolition, renovation, conservation or major maintenance of any kind shall in addition comply with the requirements of Section 10.13 of the Los Angeles Administrative Code.

2. A contractor may establish and adopt as its own Affirmative Action Plan, by affixing his or her signature thereto, an Affirmative Action Plan prepared and furnished by the Office of Contract Compliance, or it may prepare and submit its own Plan for approval.

L. The Office of Contract Compliance shall annually supply the awarding authorities of the City with a list of contractors and suppliers who have developed Affirmative Action Programs. For each contractor and supplier the Office of Contract Compliance shall state the date the approval expires. The Office of Contract Compliance shall not withdraw its approval for any Affirmative Action Plan or change the Affirmative Action Plan after the date of contract award for the entire contract term without the mutual agreement of the awarding authority and the contractor.

M. The Affirmative Action Plan required to be submitted hereunder and the pre-registration, pre-bid, pre-proposal or pre-award conference which may be required by the Board of Public Works, Office of Contract Compliance or the awarding authority shall, without limitation as to the subject or nature of employment activity, be concerned with such employment practices as:

1. Apprenticeship where approved programs are functioning, and other on-the-job training for non-apprenticeable occupations;

2. Classroom preparation for the job when not apprenticeable;

3. Pre-apprenticeship education and preparation;

4. Upgrading training and opportunities;

5. Encouraging the use of contractors, subcontractors and suppliers of all racial and ethnic groups, provided, however, that any contract subject to this ordinance shall require the contractor, subcontractor or supplier to provide not less than the prevailing wage, working conditions and practices generally observed in private industries in the contractor's, subcontractor's or supplier's geographical area for such work;

6. The entry of qualified women, minority and all other journeymen into the industry; and

7. The provision of needed supplies or job conditions to permit persons with disabilities to be employed, and minimize the impact of any disability.

N. Any adjustments which may be made in the contractor's or supplier's workforce to achieve the requirements of the City's Affirmative Action Contract Compliance Program in purchasing and construction shall be accomplished by either an increase in the size of the workforce or replacement of those employees who leave the workforce by reason of resignation, retirement or death and not by termination, layoff, demotion or change in grade.

O. Affirmative Action Agreements resulting from the proposed Affirmative Action Plan or the pre-registration, pre-bid, pre-proposal or pre-award conferences shall not be confidential and may be publicized by the contractor at his or her discretion. Approved Affirmative Action Agreements become the property of the City and may be used at the discretion of the City in its Contract Compliance Affirmative Action Program.

P. This ordinance shall not confer upon the City of Los Angeles or any Agency, Board or Commission thereof any power not otherwise provided by law to determine the legality of any existing collective bargaining agreement and shall have application only to discriminatory employment practices by contractors or suppliers engaged in the performance of City contracts.

Q. All contractors subject to the provisions of this section shall include a like provision in all subcontracts awarded for work to be performed under the contract with the City and shall impose the same obligations, including but not limited to filing and reporting obligations, on the subcontractors as are applicable to the contractor. Failure of the contractor to comply with this requirement or to obtain the compliance of its subcontractors with all such obligations shall subject the contractor to the imposition of any and all sanctions allowed by law, including but not limited to termination of the contractor's contract with the City.

EXHIBIT G

Sec. 10.8.2.1. Equal Benefits Ordinance.

Discrimination in the provision of employee benefits between employees with domestic partners and employees with spouses results in unequal pay for equal work. Los Angeles law prohibits entities doing business with the City from discriminating in employment practices based on marital status and/or sexual orientation. The City's departments and contracting agents are required to place in all City contracts a provision that the company choosing to do business with the City agrees to comply with the City's nondiscrimination laws.

It is the City's intent, through the contracting practices outlined in this Ordinance, to assure that those companies wanting to do business with the City will equalize the total compensation between similarly situated employees with spouses and with domestic partners. The provisions of this Ordinance are designed to ensure that the City's contractors will maintain a competitive advantage in recruiting and retaining capable employees, thereby improving the quality of the goods and services the City and its people receive, and ensuring protection of the City's property.

(c) Equal Benefits Requirements.

(1) No Awarding Authority of the City shall execute or amend any Contract with any Contractor that discriminates in the provision of Benefits between employees with spouses and employees with Domestic Partners, between spouses of employees and Domestic Partners of employees, and between dependents and family members of spouses and dependents and family members of Domestic Partners.

(2) A Contractor must permit access to, and upon request, must provide certified copies of all of its records pertaining to its Benefits policies and its employment policies and practices to the DAA, for the purpose of investigation or to ascertain compliance with the Equal Benefits Ordinance.

(3) A Contractor must post a copy of the following statement in conspicuous places at its place of business available to employees and applicants for employment: "During the performance of a Contract with the City of Los Angeles, the Contractor will provide equal benefits to its employees with spouses and its employees with domestic partners." The posted statement must also include a City contact telephone number which will be provided each Contractor when the Contract is executed.

(4) A Contractor must not set up or use its contracting entity for the purpose of evading the requirements imposed by the Equal Benefits Ordinance.

(d) Other Options for Compliance. Provided that the Contractor does not discriminate in the provision of Benefits, a Contractor may also comply with the Equal Benefits Ordinance in the following ways:

(1) A Contractor may provide an employee with the Cash Equivalent only if the DAA determines that either:

a. The Contractor has made a reasonable, yet unsuccessful effort to provide Equal Benefits; or

b. Under the circumstances, it would be unreasonable to require the Contractor to provide Benefits to the Domestic Partner (or spouse, if applicable).

(2) Allow each employee to designate a legally domiciled member of the employee's household as being eligible for spousal equivalent Benefits.

(3) Provide Benefits neither to employees' spouses nor to employees' Domestic Partners.

(e) Applicability.

(1) Unless otherwise exempt, a Contractor is subject to and shall comply with all applicable provisions of the Equal Benefits Ordinance.

(2) The requirements of the Equal Benefits Ordinance shall apply to a Contractor's operations as follows:

a. A Contractor's operations located within the City limits, regardless of whether there are employees at those locations performing work on the Contract.

b. A Contractor's operations on real property located outside of the City limits if the property is owned by the City or the City has a right to occupy the property, and if the Contractor's presence at or on that property is connected to a Contract with the City.

c. The Contractor's employees located elsewhere in the United States but outside of the City limits if those employees are performing work on the City Contract.

(3) The requirements of the Equal Benefits Ordinance do not apply to collective bargaining agreements ("CBA") in effect prior to January 1, 2000. The Contractor must agree to propose to its union that the requirements of the Equal Benefits Ordinance be incorporated into its CBA upon amendment, extension, or other modification of a CBA occurring after January 1, 2000.

(f) Mandatory Contract Provisions Pertaining to Equal Benefits. Unless otherwise exempted, every Contract shall contain language that obligates the Contractor to comply with the applicable provisions of the Equal Benefits Ordinance. The language shall include provisions for the following:

(1) During the performance of the Contract, the Contractor certifies and represents that the Contractor will comply with the Equal Benefits Ordinance.

(2) The failure of the Contractor to comply with the Equal Benefits Ordinance will be deemed to be a material breach of the Contract by the Awarding Authority.

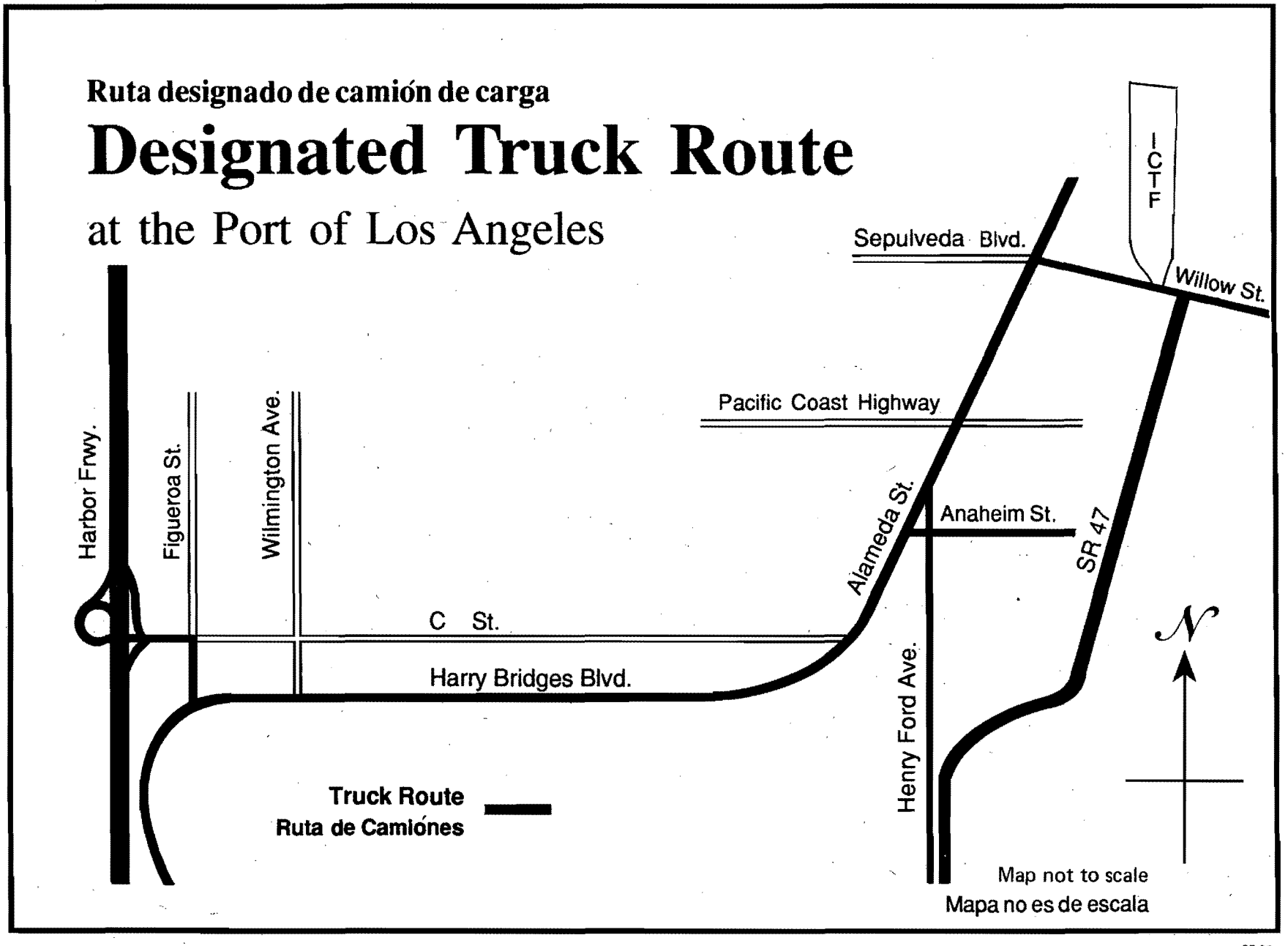
(3) If the Contractor fails to comply with the Equal Benefits Ordinance the Awarding Authority may cancel, terminate or suspend the Contract, in whole or in part, and all monies due or to become due under the Contract may be retained by the City. The City may also pursue any and all other remedies at law or in equity for any breach.

(4) Failure to comply with the Equal Benefits Ordinance may be used as evidence against the Contractor in actions taken pursuant to the provisions of Los Angeles Administrative Code Section 10.40, et seq., Contractor Responsibility Ordinance.

(5) If the DAA determines that a Contractor has set up or used its Contracting entity for the purpose of evading the intent of the Equal Benefits Ordinance, the Awarding Authority may terminate the Contract on behalf of the City. Violation of this provision may be used as evidence against the Contractor in actions taken pursuant to the provisions of Los Angeles Administrative Code Section 10.40, et seq., Contractor Responsibility Ordinance.

EXHIBIT H

TRUCKS ENTERING AND LEAVING THE PORT MUST USE THE ROUTE SHOWN BELOW.
CAMIÓNES ENTRANDO Y SALIENDO EL PORTO DEVEN DE USAR LA RUTA INDICADO ABAJO.



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