5. Engineering Division Management

- **Based on our review of the Port's Engineering Division, we found that a consolidated Engineering Manual that explains how engineering work is requested, approved, planned, budgeted, controlled, and closed out does not exist for use by Engineering Division employees and Engineering Division clients within the Port's organization. In response to a written inquiry concerning the management of engineering work, the Acting Chief Harbor Engineer stated, "Currently the Port's Engineering procedure for engineering management, control, quality control and close out is under development . . . At this time, these items are handled by individual project assessment and needs based on decisions made by the Chief Harbor Engineer, the Project Managers and Project Engineers."**

- **The Budget Analyst found that Port divisions that receive services from the Engineering Division and certain staff members within the Engineering Division have concluded that engineering projects have not been adequately coordinated and have entered construction without proper circulation for comment within Port departments, especially within the Engineering Division itself.**

- **An example of other Port Departments not coordinating their work with the Engineering Division and the consequences thereof is apparent in two written statements attributable to the Engineering Division concerning the berthing of Drydock #1 at Pier 70, Wharf #8, by the Maritime Division. Drydock #1 broke loose from 13 moorings at Pier 70 in a gale-force wind storm on November 7, 2002, and went adrift before going aground on Yerba Buena Island. The two statements, which were made by the Port's structural engineer in the Engineering Division, are as follows:**

  > **"The Maritime and Maintenance departments never consulted the Engineering Department before tying the Port's dry dock to Wharf #8."**
  >
  > **and**
  >
  > **"In retrospect the likelihood that the berthing of the 650' long drydock at Wharf 8 during the winter months would have resulted in the disengagement of the drydock from the pier was very large."**

- **The two most recent "large" capital projects managed by Port Engineering are the Downtown Ferry Terminal and the Hyde Street Harbor. Both capital projects have numerous deficiencies that could have been avoided had the Engineering Division adhered to appropriate engineering policies and procedures, including proper coordination with the project user. In response to a Budget Analyst inquiry to review evidence of project sign-offs by end-user Port Divisions for the Hyde Street Harbor, Downtown Ferry Terminal, and the China Basin Ferry Terminal projects, the Engineering Division's response was, "Engineering Dept. has no written documentation of peer review documents for these three projects. . . . Several volumes of meeting notes pertaining to these projects can be made available to the auditor for review."**

- **The Port's former Americans with Disabilities Act (ADA) Coordinator, whose sign-off on construction projects is required prior to completion and Engineering Division closeout, has made the following written statements concerning the Hyde Street Harbor Project and the Downtown Ferry Terminal Project:**

  "Hyde Street Harbor: This project was ultimately bid out and contracted in two parts; the "land side" and the "water side." I believe that I did review and approve the drawings and final construction of the water side, and its design and construction was OK for the most part. The land side however was a disaster from the early design stages onward. The poor and incomplete nature of the drawings and specifications and related design schedule overruns were a recurring source of frustration, as I reviewed them repeatedly and had to reject them each time. In successive reviews, I had to make the same observations of the same errors and omissions that had not been corrected per my prior review comments. I never signed-off on the drawings & specs, even after several reviews and resubmittals by the design team. The Port chose to send them out for construction contract bidding and entered into construction contracts regardless. I made punchlists of the final land side project, but the work remained so incomplete and of such generally poor quality that I never signed-off on it."

  "Downtown Ferry Terminal: I was never even given the opportunity to review the ferry float drawings, much less approve them. I submitted punch lists of all the deficiencies I noted in the design / construction of the ferry floats together with the related gangways and portals, including digital photos, to [name] and [name]. I don't think the Port has ever finished or corrected all those items, and I never signed-off on the ferry docking facilities and most of the Ferry Plaza work. I only signed off on one small raised mini-plaza area between the Ferry Building and Pier ½ that is alongside the Embarcadero."

- **Concerning the Port's attitude toward and compliance with ADA requirements in general, the Port's former ADA Coordinator has made the following statement:**

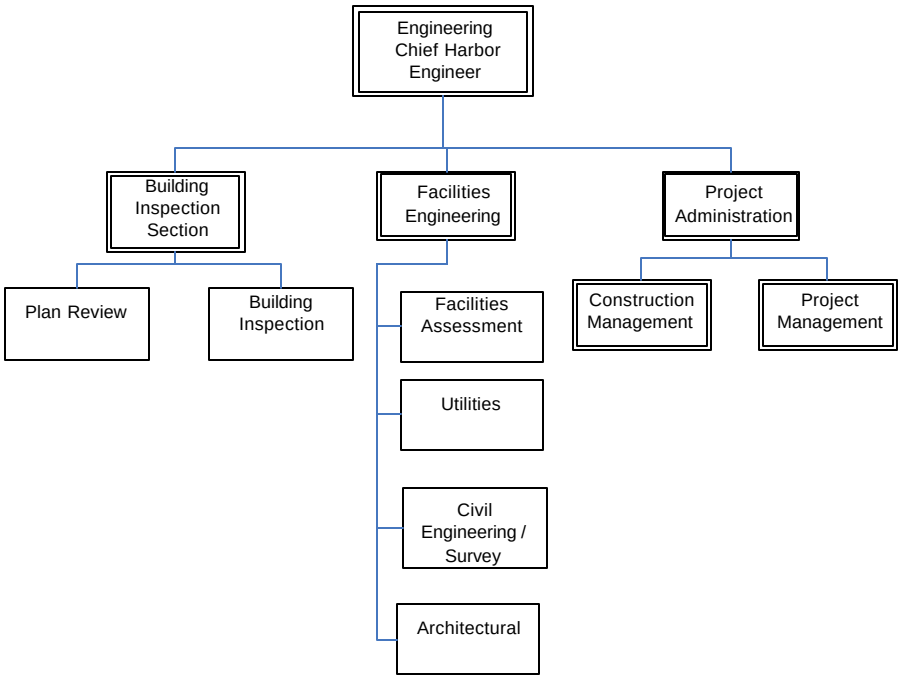
  "City Policy, per the Mayor's Office on Disability (MOD), was and remains that all City projects are to be reviewed and approved by MOD staff or other city staff they designated as having permission to do it in their stead. Only two people outside MOD had that status at the time of this project: the DPW Disability Access Coordinator and the Port ADA Coordinator (i.e. me). MOD did not sign off on these projects, the DPW Disability Access Coordinator was not involved since these projects did not involve DPW. MOD was not involved since it had delegated plan review and inspection to the Port's ADA Coordinator. I as the Port's ADA Coordinator was not fully included in the process and / or was ignored in the process. The result is publicly funded projects that do not comply with all applicable federal, state and local ordinances, codes, statutes and regulations that are intended to provide for the health, safety, welfare and equal rights of the people who use them."

Engineering Division Mission and Organization

The Engineering Division provides project and construction management, engineering design, facility inspection, contracting, code compliance review, and permitting services for all of the Port's facilities including piers, structures, buildings, cranes, utilities, public and private areas, development projects, streets and walkways. An organizational chart of the Engineering Division is shown below.

Exhibit 5.1

Engineering Division Organizational Chart



The Engineering Division is authorized a total of 27 full-time equivalent positions in the Port's FY 2003-2004 budget, and is managed by a classification 9379, Chief Harbor Engineer. The Chief Harbor Engineer oversees a staff of engineers, architects, project managers, surveyors, building and construction inspectors, and draftspersons in implementing harbor-related construction and other engineering projects. The Chief Harbor Engineer reports to the Deputy Director of Engineering and Maintenance.

The Facilities Engineering Group is responsible for the overall maintenance and repair of Port facilities and fulfills this mission by performing regular assessments, preparing and maintaining facility assessment drawings and records, recommending appropriate facility dispositions, preparing repair designs, and building permit plan checking. The Facilities Engineering Group works closely with the Maintenance Division to coordinate repairs and improvements. This group also provides technical expertise to the Project Administration Group by providing designs, surveying, etc., and to the Building Inspection Section by providing specialized plan checking and all electrical and mechanical plan checking.

The Facilities Engineering Group is also responsible for regulating accessibility issues, including receiving complaints and concerns of Port staff and Port clients.

The Project Administration Group is responsible for administering contracted complex projects, such as the Hyde Street Harbor Project and the Downtown Ferry Terminal

Project, and the funding for all projects. The role of the Project Manager is to manage assigned projects with respect to budget, schedule, and technical aspects.

Policy and Procedures Manual

Port Engineering, which has reportedly been in existence in one form or another since the 19th century, does not have an Engineering Manual that explains how engineering work is requested, approved, planned, budgeted, controlled, and closed out. In response to a written inquiry concerning the management of engineering work, the response stated "Currently the Port's Engineering procedure for engineering management, control, quality control and close out is under development. . . At this time, these items are handled by individual project assessment and needs based on decisions made by the Chief Harbor Engineer, the Project Managers and Project Engineers." Thus, a primary means of achieving good administrative control, including operational efficiency and adherence to management policies, is handled on an ad hoc basis. Examples of topics covered in procedures manuals are shown in Table 5.1 below.

Procedures serve important functions, including those that follow:

- A self-regulating control standard for performing work,
- An efficiency and effectiveness tool incorporating best practices or lessons learned, and
- A training and indoctrination tool for newly assigned personnel.

Lack of a consolidated, up-to-date procedures manual for the Engineering Division is a major deficiency that should be corrected on a priority basis. A good procedures manual is a guidance, control, and training tool that is indispensable to effective operations within the Engineering Division.

Table 5.1

Procedures Manual Example Contents

• Design Review Process	• Construction Management
• Document Retention Policy	• Drawing and Specifications Standards
• Plan Checking Procedures	• Work Order Requests
• Accessibility	• Project Coordination
• Streets & Mapping	• Project Cost Control
• Milestone Reporting	• Transferring Funds
• Managing Consultant Contracts	• Project Estimating
• New Equipment Acceptance	• Engineering Directives and Bulletins

In addition to the foregoing examples, the Engineering Manual should describe the responsibilities of each engineering functional role, such as the responsibilities of project managers, project engineers, construction managers, resident engineers, and construction inspectors. Interactions between engineer functions should also be described.

Coordinating and Documenting Engineering Projects

Coordinating Engineering Projects

The Budget Analyst was informed by other Port divisions and by certain staff members within the Engineering Division that engineering projects have been inadequately coordinated and have entered the construction phase without proper circulation for comment within Port departments, and especially within the Engineering Division itself. The current Acting Chief Harbor Engineer has stated that such incomplete coordination did occur prior to September of 2002 when the Port's previous Chief Harbor Engineer developed an intra-Port memorandum titled "Capital Project Interdivisional Final Sign-off Procedure," which initiated effective coordination procedures. However, that review procedure pertained only to projects estimated to exceed $1 million in construction costs or "those that are complex or sensitive." As stated in the memorandum, "The intent is to ensure and document that while these projects are designed to meet Port's proprietary needs, they are in compliance with San Francisco Building, Fire, and Title 24 Accessibility Codes and applicable environmental, health and safety laws and regulations." According to the current Acting Chief Harbor Engineer, the coordination policy was verbally extended to cover all capital projects in December of 2003.

In response to an inquiry concerning whether contract drawings and specifications reviewed by the Port end-user department for code compliance, environmental compliance, permit requirements, constructability, etc., the Engineering Division made the following statement:

> The contract drawings and specifications, after completion of the design, are reviewed by either the group leader or another professional engineer in the group for consistency, constructability, value engineering . . . . After a thorough internal checking, construction drawings and specifications are sent with a Project Sign-off Sheet to Port End User Departments: Real Estate/Maritime . . . Environmental . . . Fire Marshal . . . Planning & Development . . . and Maintenance . . . .

However, in response to a request to provide the results of such reviews for the Hyde Street Harbor, Downtown Ferry Terminal, and China Basin Ferry Terminal projects, the Engineering Division made the following statement:

> Engineering Dept. has no written documentation of peer review documents for these three projects (See response to question #3b[1]). Several volumes of meeting notes pertaining to these projects can be made available to the auditor for review.

Having a policy of not keeping copies of red-marked check prints due to office storage limitations may be valid, if not mandated by legal or professional standards. However, retention of the "Project Sign-off Sheet," annotated to record any comments or concerns of significance, would be a reasonable procedure to verify coordination and provide evidence of user-department concerns, if any.

Management and Coordination of the Hyde Street Harbor Project

According to the Engineering Division, the Hyde Street Harbor Project was designed to support the fishing industry in Fisherman's Wharf by constructing a new 62-berth marina facility for commercial fishing vessels at the north end of Hyde Street Alley. The project included new utilities to support the harbor operations, new asphalt roadway paving, demolition of specific buildings to accommodate a new 24 car parking lot, a new parking lot annex to accommodate a new 21 car waterside parking lot, and new bathroom and storage facilities.

For purposes of reducing costs, the Hyde Street Harbor Project was divided into two separate projects: Landside and Waterside.

Working with personnel from various departments within the Port, including the Engineering Division, the auditors compiled a list of project problems, which, according to experienced project users and engineers, constitute a project that should not have been accepted as delivered by either the consultant responsible for the design or by the contractor. The Project problems, some of which have been remedied, are divided into design-related issues and construction-related issues, and are listed below.

a. Hyde Street Harbor: Design-related Issues

1. The white vinyl bumpers along the edge of the Harbor floats were not designed to accommodate the forces imposed by the fishing vessels using the facility. (Some Port staff have stated that the Hyde Street Harbor seems to have been designed for pleasure boats rather than for fishing vessels, which require more rugged construction.)
2. Bilge system not functional as originally conceived to allow for discharge directly to city sewer system.

[1] Response 3b is as follows: *Port engineering typically manifests its peer review as red-marks on check prints (design drawings). It is Engineering's policy to not keep copies of its red-marked checkprints due to office storage limitations and avoidance of clutter. Therefore written evaluations are not available for the Hyde Street Harbor and Downtown Ferry Terminal projects.*

a. Vacuum pressure inadequate to allow for simultaneous use of multiple intake hydrants.

b. Valve control system doesn't permit the nine hydrant systems to operate (reduced to two hydrants). Valves delivered, determined to be inadequate, were accepted and paid for and remain uninstalled at the job site.

c. Oil/water separator system inadequate and additional filtration system design subject to ongoing delay. This requires effluent to be pumped and trucked to a disposal site, which is costly and causes system to be shut down frequently.

d. Oil/water separator for bilge connected to storm water drains that add to volume of unsuitable effluent that cannot be pumped to city sewer and inflates cost for disposal.

e. Controls for pumps mounted on exterior wall and not enclosed in lockable cabinet, subject to weather deterioration and vandalism.

3. Security monitoring camera system never delivered functioning.
4. Main gate has never worked properly (closer insufficiently rugged, did not meet ADA specifications).
5. Deficiencies in the float construction components:
    a. Whaler material cupped and cracked.
    b. Rub-rail material fasteners deficient.
    c. 2" x 12" Whalers installed over 2" x 8" Backing, exposing the lower part of the whalers to forces causing breaks.
6. Piles inadequate:
    a. Lengths were too short; required adding on additional lengths.
    b. Rough finish on piles caused chaffing on the collar fixtures.
7. Lighting Controls are non-functional and Fixture Mountings are totally inadequate: lights turn off and on without any inputs and the lighting fixtures easily fall off.
8. Blue Shed Building roof leaked over improvements.
9. No demonstration of functions or operation, nor labeling of components in the machinery room.
10. ADA berth-cleats were not designed to withstand forces applied – never repaired.

In addition to the foregoing, the auditors have been informed that there were a total of approximately 120 Requests for Information[2] (RFI) from the contractor concerning the Landside Project only, which to informed engineering persons seems an extraordinarily high number of RFIs for such a project.

Construction projects are required to obtain sign-offs from a certified Americans with Disabilities (ADA) Coordinator. In the instance of the Hyde Street Harbor Project, the former Port ADA Coordinator, who has since transferred to another organization, has made the following statement:

> Hyde Street Harbor: This project was ultimately bid out and contracted in two parts; the "land side" and the "water side." I believe that I did review and approve the drawings and final construction of the water side, and its design and construction was OK for the most part. The land side however was a disaster from the early design stages onward. The poor and incomplete nature of the drawings and specifications and related design schedule overruns were a recurring source of frustration, as I reviewed them repeatedly and had to reject them each time. In successive reviews, I had to make the same observations of the same errors and omissions that had not been corrected per my prior review comments. I never signed-off on the drawings & specs, even after several reviews and resubmittals by the design team. The Port chose to send them out for construction contract bidding and entered into construction contracts regardless. I made punchlists of the final land side project, but the work remained so incomplete and of such generally poor quality that I never signed-off on it.

b. Hyde Street Harbor: Construction-related Issues

1. Bilge system doesn't work:
    a. Intake hoses not rated for use with petroleum products although the specifications called for such rating.
    b. No demonstration of operation by contractor, accepted in questionable operational condition
2. Deficiencies in the float construction components:
    a. Warranty tension and adjustment of the float component not performed after harbor was occupied and loaded to operational levels.
    b. Through bolts improperly adjusted/protruded creating snags and sharp points, resulting in vessel and equipment damages.
3. Truncated dome walkway was improperly installed and never repaired.

[2] A Request for Information is a document prepared by a contractor and addressed to the project owner (the Port) requesting additional information or a clarification concerning some aspect of a construction project.

4. Harbor sign improperly installed; sign was glued instead of bolted; sign fell off and has never been repaired.
5. Vinyl bumpers, which are nailed to the wooden whalers, were improperly installed (specifications called for stainless steel, ring-shank nails, but installation was with smooth-shank, roofing nails).

Engineering Division Comments Concerning Hyde Street Harbor Design

The Engineering Division acknowledges that the design of the Hyde Street Harbor was problematic, and has made the following specific comments concerning the problems encountered:

> Hyde Street Harbor
>
> Started 1986 stopped due to 1989 earthquake. . . . Because of lack of adequate available staff in Engineering department, Port issued an RFP for the design of Hyde Street Harbor. Port Engineering staff followed the applicable public contracting code and awarded the design this contract to Concept Marine Associates (CMA) in 1998. . . .
>
> Port's team had [m]any problems with CMA and design team. CMA continually was changing their project manager and design team members. Continuity was a problem that is demonstrated by the problems encountered in the construction.
>
> After Engineering had begun working with the CMA design engineers, Planning and Environmental made several design changes based on permitting requirements and commitments from the public, which caused changes in the design engineers' scope of work and cost. When construction bids came in higher than anticipated and greater than the available funding, the Port had to reject all bids. CMA was asked to value engineer the project. . . . The project was split into two components, which were bid separately. These changes required additional revisions to the construction plans and specs. This resulted in $500,000 reduction in project cost. As directed by the Mayor, Port staff advertised and awarded the two components projects even though some of the construction drawings and specifications, including the utilities, were not complete. . . .
>
> Several changes in the criteria given to the design teams by Planning/Environmental, and subsequent design changes made to reduce costs have resulted in some permit related issues, increased operational and maintenance costs. Other Port departments who reviewed the construction plans failed to catch design flaws (e.g. access to fuel lines for testing, permitting requirements for oil/water separator). In the field changes to project design to meet environmental and other requirements

have resulted in costly change-orders. Deficient construction plans and specifications have resulted in an inordinate number of "requests for information" from the contractor, each one requiring investigation, causing project delays, and often increasing costs.

Downtown Ferry Terminal Project

The Downtown Ferry Terminal project consists of two new ferry terminals, a protective breakwater, public access improvements, and improved signage. The total cost of approximately $19.8 million was funded with $15.7 million in grants and the balance with Port capital funds. The Breakwater, East Promenade and North Marginal Wharf were completed and opened in early October of 2001 and the North Terminal was completed and opened in early May of 2002.

According to the Engineering Division, the new and renovated ferry facilities solved a number of challenges associated with scheduling arrivals and departures of numerous ferry operators, as well as provided increased opportunities for additional ferry runs and new ferry routes. Ferry operators currently using the facility include Blue and Gold Fleet, Red and White Fleet, Alameda-Oakland Ferry, and Harbor Bay Operators.

As with the Hyde Street Harbor Project, the Budget Analyst worked with personnel from various departments within the Port in order to identify design and construction areas that the Engineering Division needs to improve upon.

c. Downtown Ferry Terminal: Design-related Issues

1. Brow ramps disengage from ferryboats at medium wave conditions.
2. Door lock timers blow fuses.
3. Hydraulic fittings-connectors corroded (not stainless steel).
4. Hydraulic fluid return plumbed incorrectly - pressure delivery line bypasses filter.
5. The hydraulic lines are continually leaking and depositing hydraulic oil onto the deck of the floats where it is washed into the Bay.
6. The terminal float decks do not have proper drainage contours to prevent accumulation of salt and other materials along welds and manholes. Salt crystals routinely form along the welds and in the event of a coating failure will attack the welds and potentially compromise the integrity of the float hull.
7. Pile guide collar bolts are not Nylock/stainless; regularly loose and rusting.
8. Lighting fixtures inoperative at various points for extended periods.
9. Vessel door height/dock ramp height conflict and repair resolution.

As previously stated, construction projects are required to obtain sign-offs by an Americans with Disabilities (ADA) Coordinator. In the instance of the Downtown Ferry Terminal, the former Port ADA Coordinator, who has since transferred to another organization, has made the following statement:

> Downtown Ferry Terminal: I was never even given the opportunity to review the ferry float drawings, much less approve them. I submitted punch lists of all the deficiencies I noted in the design / construction of the ferry floats together with the related gangways and portals, including digital photos, to [name] and [name]. I don't think the Port has ever finished or corrected all those items, and I never signed-off on the ferry docking facilities and most of the Ferry Plaza work. I only signed off on one small raised mini-plaza area between the Ferry Building and Pier ½ that is alongside the Embarcadero.

d. Downtown Ferry Terminal: Construction-related Issues

1. Main doors: Racked hinges out-of-adjustment; doors would not close or lock (problem persisted for 18 months).
2. The checkered plates on seismic joints sit higher than the surrounding sidewalk, resulting in a tripping hazard as well as raising ADA compliance issues.
3. Electrical wiring shorts causing electrical failures.
4. Electrical conduit corroded; also, mounting bracket is loose.
5. The manual emergency hydraulic pumps were not installed.
6. Coatings are rusted through; area not cleaned of welding slag prior to coating resulting in rust points.
7. Brow ramp safety cables not delivered at gate B.

Engineering Division Comments Concerning Downtown Ferry Terminal (DFT)

The Engineering Division acknowledges that construction of the Downtown Ferry Terminal Project was problematic, and has made the following specific comments concerning the problems encountered:

> In 1992-93 Port planning staff developed the initial DFT project concept with input from various project stakeholders, including the Metropolitan Transportation Commission, Golden Gate Transit and other ferry boat operators, and Port Real Estate, Environmental and Engineering Departments. . . .

> Engineering assessed its staff resources and made the decision to execute a portion of the engineering services in-house and subcontract out the remaining required A/E services. Engineering prepared a Request for Proposals (RFP) for A/E services and ROMA Design Group was retained to commence design services in 1994. . . .
>
> During Phase I Port engineering and ROMA continued to further develop the project concept by conducting numerous meetings with various project stakeholders. ROMA and its subconsultants prepared architectural, electrical, and mechanical drawings and specifications for the project. . . .
>
> . . . The revised project was bid and Miller Thompson General Contractor (GC) was awarded the contract for approximately $13 million. . . .
>
> Manson Construction was the GC's marine subcontractor and Lucas Marine of Sacramento was the float fabricator subcontractor (FFS).
>
> The GC installed the work specified by Port engineering and ROMA and for the most part the Port was pleased with the quality of the work and the responsiveness of the GC. However, both the Port and GC had significant problems with the FFS. This subcontractor repeatedly failed to produce shop drawings and design calculations, and when they finally did produce them they wee rejected by the Port. Numerous letters were sent by the Port and the GC in an attempt to force the FFS to meet the requirements of the contract. After numerous Notices to Cure and attempts by both the Port and GC to force the subcontractor to produce a schedule showing how they were going to meet the project deadlines following a catastrophic failure of the float superstructure coating system, the GC terminated the subcontractor and took over their work. As a result of [sic] the floats were installed substantially behind schedule.

Engineering Documentation

The City's general conditions for construction contacts (Document 00700) require that certain documents be conveyed by the contractor to the City as contract deliverables. In order to determine whether the Port has been requiring such deliverables and whether the Port has been maintaining those deliverables in accordance with the Port's retention policies, the Budget Analyst requested evidence of proper construction contract closeouts on a total of nine Port construction projects. The documents requested included correspondence from contractors requesting substantial and final completion of the projects and the Port's responses to those requests.

The documents provided to the Budget Analyst in response to this request were inadequate. Of the documentation requested, two of the nine projects had only the Notice of Final Completion. Documentation for the Notice of Substantial Completion was available for only three of the nine projects.

The lack of proper contract documentation is another example of not enforcing proven, documented procedures to control engineering work.

The Drydock #1 Incident

Background

On November 7, 2002, the marine vessel Drydock #1, which is a 654 feet long by 125 feet wide steel drydock owned by the Port, broke loose from 13 moorings at Pier 70 in a gale-force wind storm and went adrift before going aground on Yerba Buena Island. Drydock #1 has been a "named asset" in the leasehold interest of San Francisco Drydock, a private firm that is the operator of the Port's ship repair facilities. Drydock #1 was relocated to Pier 70 in September of 1999 after being declared no longer operable as a drydock.

On November 8, 2002, Port divers found that 1) the drydock's port aft section was hard aground on a gravel beach, 2) the drydock's port mid section had been punctured by a rock outcropping, 3) the drydock's port forward section and starboard side was afloat, and 4) 14 of 24 previously dry floatation tanks were taking on water. After an initial investigation and review of Drydock #1 between November 8, 2002, and November 11, 2002, by Port staff and a salvage consultant retained by the Port, the Port's Maritime Director notified the President of the Port Commission that Drydock #1 could sink and posed a potential threat to (a) navigation, (b) the Bay Bridge footings, (c) the BART transbay tunnel, and (d) the habitat and waters of the Bay, and therefore required immediate recovery and repair work.

On November 12, 2002, the President of the Port Commission declared the existence of an emergency condition requiring immediate repairs to secure the drydock and repair holes in the hull of the drydock to prevent the drydock from sinking. The Port incurred total costs of $1,716,000 for services and materials relating to the emergency response, recovery, and repair of Drydock #1. Drydock #1 was moored at San Francisco Drydock's Pier 4 on January 6, 2003.

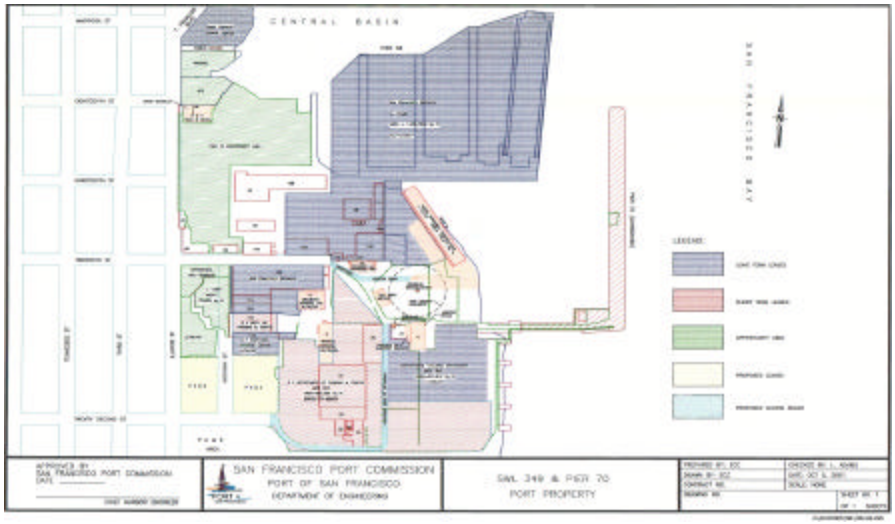
Structural Analysis of Pier #8

Pier 70, Wharf #8, is shown in Exhibit 5.2. Wharf #8 east, the location where Drydock #1 was berthed, abuts the open San Francisco Bay: there are no intervening structures to impede the path of a vessel or drydock that sets out to the Bay from Wharf #8.

Pier 70, Wharf #8, is fenced, not open to the public, dilapidated, and has holes in its deck through which a human might fall. Concerning the current condition of Wharf #8, in a March 5, 2004, memorandum to the Port's Chief Harbor Engineer and Facilities Assessment Engineer, the Port's structural engineer made the following statements concerning the forces imposed on Wharf #8 by Drydock #1:

Exhibit 5.2

Pier 70 - Wharf #8



The attached photographs clearly depict several failures in the wood framing and steel framing supporting the bitts. This damage likely resulted from the huge forces imparted by the drydock on the bits and the inability of the dry-rotted wood framing and the corroded structural steel to adequately carry these forces.

Attached photograph no. 5 depicts a bit that has rotated approximately 70 degrees from its original position, clearly indicating failure due to a large applied lateral force. The pilebutt[3] who participated in this reconnaissance indicated that this bitt was in this position *prior* to the berthing of the drydock!

The Structural Engineer, in drawing conclusions concerning the current general condition of Wharf #8 and what those conditions reveal about the conditions that existed in November of 2002, has made the following statements:

Wharf #8's substructure has in general incurred severe environmentally-induced structural damage, resulting in substantially reduced lateral load-carrying capacities for its bitts. The wharf has not been maintained, and the corrosive damage to structure has occurred and accumulated over decades. Wharf #8 should at this point be red-tagged until a thorough structural investigation is performed and the required repairs have been completed.

[3] Pile workers are in maritime jargon call "pilebutts."

> Prior to the berthing of the drydock at Wharf 8, there existed clear evidence of accumulated structural damage to the pier's substructure. The severely rotated bitt shown in attached photograph no. 5 plainly indicates an obvious structural failure, likely from a ship's or barge's applied berthing lateral force, that occurred prior to the drydock's berthing at Wharf 8. This somewhat spectacular structural bitt support failure alone provides evidence that the remainder of the bitts' support framing is suspect.
>
> *In retrospect the likelihood that the berthing of the 650' long drydock at Wharf 8 during the winter months would have resulted in the disengagement of the drydock from the pier was very large [emphasis added].*

The Port's Structural Engineer has stated unequivocally that the probability of Drydock #1 disengaging from Wharf #8, given the condition of Wharf #8 and the lateral forces that would be imposed on Wharf #8 by Drydock #1 during winter gales "was very large."

In the course of this management audit, the auditors observed the Port drawing shown in Exhibit 5.2 that shows Wharf #8 at Pier 70 as being "condemned." In response to an inquiry concerning why Drydock #1 would be moored to a condemned wharf, the Engineering Division explained that the drawing shown in Exhibit 5.2 erroneously shows Wharf #8 as being condemned, that the drawing was so marked by a member of the Port's Real Estate Division, and that the drawing was never approved by Port Engineering. In its response to the inquiry concerning the Wharf #8 drawing, the Engineering Division also made the following statement concerning the berthing of Drydock #1 at Wharf #8:

> ***The Maritime and Maintenance departments never consulted Engineering Department before tying the Port's dry dock to Wharf # 8.***

Lessons Learned from the Drydock #1 Incident

The Drydock #1 incident was reported to the Board of Supervisors in March of 2003 and the Board of Supervisors reappropriated funds to pay for the emergency salvage and recovery operations. Our purpose in reviewing the Drydock #1 incident is show how a lack of coordination between Port divisions can lead to or exacerbate serious incidents, and to determine whether the Port has used the incident to generate plans or controls for other possible serious or catastrophic incidents that could occur on Port property. Many of the buildings, piers, and other structures and equipment on Port property are old, obsolete, not maintained, or condemned. Planning sessions to determine what serious or catastrophic incidents have a mid- to high-possibility of occurring and then implementing controls to alleviate or obviate such occurrences would be a good use of Port management time, in the opinion of the Budget Analyst. Recent incidents involving the fire at site J-10 in Fisherman's Wharf on March 28, 2004, and the structural failure on the China Basin Gangway at SBC Park highlight the Port's vulnerability to hazardous incidents.

The Budget Analyst requested to see any documents that involved lessons learned from the Drydock #1 incident. The auditors were provided with documents that described the incident and actions taken by the Port and various contractors to deal with the incident. Included in the documentation was a letter from the Coast Guard commending the Port on its actions taken response to the incident. However, the auditors have not been provided with any documents showing that thought and efforts were applied to what might be done to lower the probability of a serious or catastrophic incident on property under the control of the Port of San Francisco.

Conclusion

Port Engineering, which has reportedly been in existence in one form or another since the 19th century, does not have an Engineering Manual that explains how engineering work is requested, approved, planned, budgeted, controlled, and closed out. In response to a written inquiry concerning the management of engineering work, the response stated "Currently the Port's Engineering procedure for engineering management, control, quality control and close out is under development. . . At this time, these items are handled by individual project assessment and needs based on decisions made by the Chief Harbor Engineer, the Project Managers and Project Engineers." Thus, a primary means of achieving good administrative control, including operational efficiency and adherence to management policies, is handled on an ad hoc basis.

Based on responses to requests for documentation concerning projects managed by the Engineering Division, the Port is not retaining contract documents in accordance with its own retention policy.

Coordination within the Engineering Division and between the Engineering Division and other divisions within the Port has been inadequate. Such inadequate coordination between Port divisions is exemplified in the Drydock #1 incident and in the negative user comments concerning the Hyde Street Harbor and Downtown Ferry Terminal Projects. Within the Engineering Division, the inappropriate responses to the efforts of the ADA Coordinator to ensure that the Hyde Street Harbor and Downtown Ferry Terminal Projects complied with ADA regulations exemplified such inadequate coordination.

Recommendations

The Chief Harbor Engineer should:

5.1 On a high priority, comprehensive basis, develop an Engineering Manual that provides policies and procedures for conducting the business of the Engineering Division.

5.2 Ensure that engineering projects that require coordination with Port user and support divisions are fully coordinated with such non-Engineering Division personnel and that such coordination is documented.

5.3 Ensure that all engineering projects are fully coordinated within the Engineering Division.

5.4 Review the existing Engineering Division retention policy and update the policy, if necessary, and ensure that the Engineering Division complies with the retention policy.

5.5 Ensure that the Engineering Division complies with all ADA regulations.

The Executive Director should:

5.6 Conduct a formal review and evaluation of the Drydock #1 incident to extract lessons learned and to determine whether other Port facilities or activities should be changed in any manner to make them safer and whether specific procedures should be included in the Port's Procedures Manuals to aid in preventing such incidents in the future.

Costs and Benefits

There would be no new direct costs associated with these recommendations, which can all be accomplished in-house without additional staff. The benefits of the recommendations would include having an Engineering Manual to serve as a guide to performing engineering activities and to completing engineering and construction projects that are well coordinated and better serve user needs.