

FAC 1511 Pier

RUC \$2,589.65 SY

Source: Review of MILCON submissions to Congress for period FY-01 to FY09 as described in the white paper which follows:
In V12, Tri-Service and USACE PAX Newsletter values were updated while all other values were inflated only.

SUC \$29.00 SY

Source: Commercial port data received in independent communication; compared with NAVAUDSVC P-7520.1, *Standardizing Pier Construction for Deep Draft/Power Intensive Ships*. Commercial data resulted in higher sustainment cost per SY than Naval Audit Service projections; higher commercial result selected as more conservative estimate.
In V12, values were inflated only.

Review of FAC 1511, April 2009

Background:

This review was conducted at the request of the Navy (CNIC N-46) for the purpose of determining if an increase in the replacement cost factor for FAC 1511, Piers, was warranted. At issue is the difficulty in seeking approval of repair projects which exceed the threshold for repair versus replacement.

In support of this review the Navy submitted the 2002 Navy Audit Report, *Standardizing Pier Construction for Deep Draft/Power Intensive Ships*, N2003-0021.

Discussion:

FAC 1511, Piers and 1512, Wharves has 851 records, with each Service having the following:

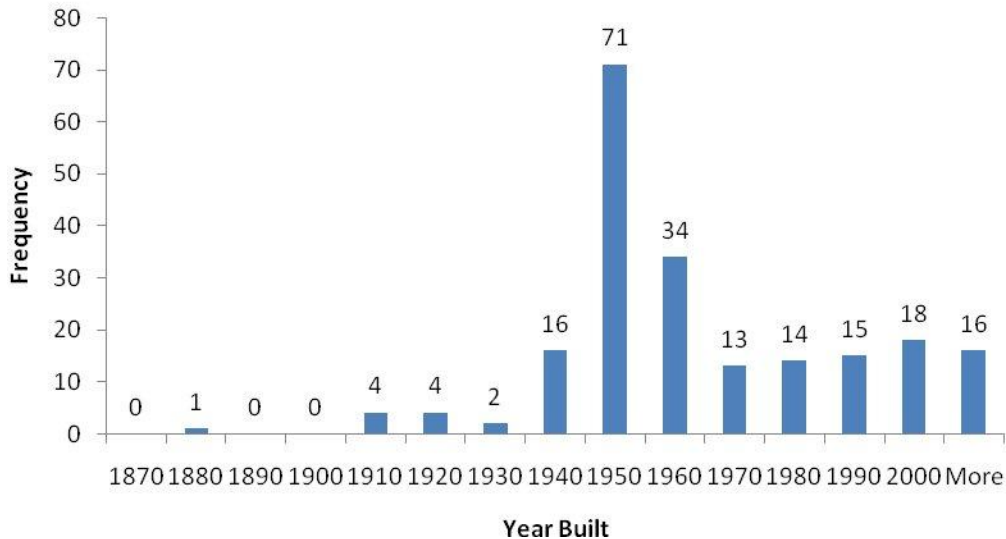
<u>Service</u>	<u>Number of Records</u>
Army	70
Air Force	53
Marine Corps	21
Navy	707
Total	851

For the Navy, the 707 records are segregated into the following category codes:

CATC ODE	CATCODE Description	Number of Records
15110	AMMUNITION PIER	10
15120	GENERAL-PURPOSE BERTHING PIER	208
15130	FITTING-OUT PIER	1
15140	FUELING PIER	19
15150	REPAIR PIER	35
15160	SUPPLY PIER	7
15171	DEGAUSSING PIER (SEE 159-20)	1
15180	DEPERMING PIER (SEE 159-30)	7
15210	AMMUNITION WHARF	38
15220	GENERAL-PURPOSE BERTHING WHARF	133
15230	FITTING-OUT WHARF	1
15240	FUELING WHARF	35
15250	REPAIR WHARF	31
15260	SUPPLY WHARF	26
15270	ORDNANCE CONTAINER-HANDLING WHARF	2
15420	DEEP WATER BULKHEAD QUAYWALL WITH RELIEVING PLATFORM	153
Grand Total		707

The preponderance of facilities is categorized as general-purpose berthing piers. Piers are approximately equally divided between those constructed up to 1950 (98), and those constructed after 1950 (110), with 63 (30%) built since 1980.

Navy CatCode 15120 General Purpose Berthing Pier



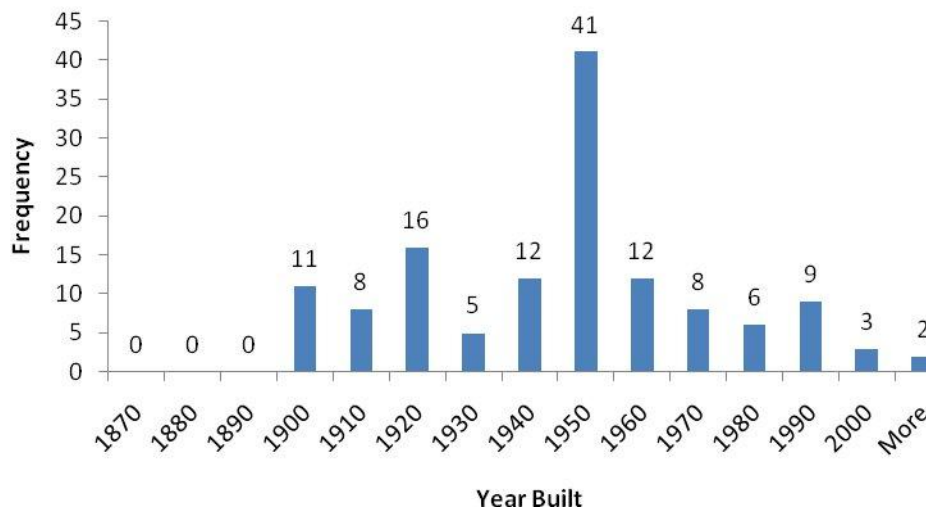
Replacement Cost Factor - Current Situation

The replacement cost factor for piers is presently based upon the Marshall and Swift valuation for major shipping docks, consisting of heavy concrete decking and piles. The cost range given in December 2007 was \$103 to \$155 per square foot. The midpoint of this range was used, adjusted for area (Washington DC taken as the norm) and updated for the current year using the OSD selling price based index (SPBI) reflecting actual inflation in the construction industry. This yielded a cost factor of \$1305.64 for Version 11 (\$FY-09).

The replacement cost factor for FAC 1512 is set equal to FAC 1511. While this results in a higher cost for a wharf than expected, it has been used as the conservative approach to a facility that is seldom constructed.

The Navy inventory of wharves has the following age distribution:

Navy CatCode 15220 General Purpose Berthing Wharf



Analysis of the Navy Audit Service Cost Study

The Navy Audit Service report was prepared at the request of ASN (I&E) to determine why the Pacific and Atlantic Fleets were constructing different types of berthing piers to accommodate the same contingency of ships, with the Atlantic favoring double deck piers and the Pacific single deck.

The cost analysis in this report was performed by Michael Baker Corporation. The analysis compared the construction cost of single and double deck piers at Norfolk and San Diego using prototype designs.

The total costs developed by Baker include a number of features not currently included in the FAC replacement cost factor. These features include sanitary sewer, potable water distribution piping, compressed air system, electrical distribution, substations, lighting, and communications systems.

Each of these systems is intended to be separately inventoried, as each has a individual category code and FAC, with a distinct replacement and sustainment cost. Likewise, each of these systems is separately shown as a cost item on the Navy construction document submitted to the Congress, the DD1391.

Taking the Baker analysis as it stands, with these systems included, results in the following unit costs:

No adjustments to NAVAUDSVC study	NS San Diego		NS Norfolk	
	SDP	DDP	SDP	DDP
Total \$M	35.92	38.69	33.27	35.45
Area SF	180000	274500	180000	274500
Area SY	20000	30500	20000	30500
Unit Cost \$M	0.001796	0.0012685	0.0016635	0.0011623
Unit Cost \$02	\$ 1,796.00	\$ 1,268.52	\$ 1,663.50	\$ 1,162.30
SPBI (02-08)	1.45705	1.45705	1.45705	1.45705
MCON 08-09	1.0204082	1.0204082	1.0204082	1.0204082
Unit Cost \$09	\$ 2,670.27	\$ 1,886.02	\$ 2,473.27	\$ 1,728.08

Cost data from NAVAUDSVC N2003-0021, pg 25 and 29

MCON 08 -09 inflation factor from "Green Book" Table 5-6 MCON

SPBI is the DUSD(I&E) Selling Price Based Index for actual inflation

Adjusting these costs by removing the separate FACs, we obtain the following:

Cost Adjusted by Removing separate FACs	San Diego		Norfolk	
	SDP	DDP	SDP	DDP
S/T Section A	\$ 44,605,197.00	\$ 34,754,844.00	\$ 44,605,197.00	\$ 34,754,844.00
Deletions Sec B	\$ 10,393,455.00	\$ 11,123,014.00	\$ 23,039,178.00	\$ -
S/T Sections A less B	\$ 34,211,742.00	\$ 23,631,830.00	\$ 21,566,019.00	\$ 34,754,844.00
Add Back		\$ 5,196,580.00	\$ 4,601,966.00	
Deleted FAC Items	\$ 14,751,629.00	\$ 12,378,026.00	\$ 5,922,175.00	\$ 12,378,026.00
New S/T	\$ 19,460,113.00	\$ 16,450,384.00	\$ 20,245,810.00	\$ 22,376,818.00
new S/T %	57%	70%	94%	64%
Total	\$ 35,922,330.00	\$ 38,685,901.00	\$ 33,266,857.00	\$ 33,266,857.00
Section D FAC items		\$ 7,025,975.00	\$ 10,285,812.00	\$ -
Adjusted Total		\$ 31,659,926.00	\$ 22,981,045.00	\$ 33,266,857.00
x Adjusted Total	\$ 20,433,119.16	\$ 22,038,832.38	\$ 21,574,212.22	\$ 21,418,781.35
Area, SY	20000	30500	20000	30500
Unit Cost	1021.655958	722.5846681	1078.710611	702.2551263
SPBI (02-08)	1.45705	1.45705	1.45705	1.45705
MCON 08-09	1.0204082	1.0204082	1.0204082	1.0204082
Unit Cost \$09	\$ 1,518.98	\$ 1,074.33	\$ 1,603.81	\$ 1,044.10
Average				\$ 1,310.31

This result is comparable to the FY-09 replacement cost factor of \$1,305.64.

Analysis of Military Construction Documents

Examining the DD1391 submissions for the past 10 years, another unit cost can be developed. This spreadsheet derives an average cost, in \$FY-09, based upon the military construction project submissions from FY-01 to FY-09.

See Chart that follows:

This analysis yields an average unit price of \$2,819.18 per SY, compared with the present replacement cost factor of \$1,305.64.

If the FY-09 New London Pier 31 project was excluded, the average cost would be reduced to \$2,639.85. The unit cost of the New London pier replacement project is significantly greater than any other pier project over the past 10 years.

In this analysis, only the pier itself, plus associated piling and fender systems, have been included.

Review

Based upon the analysis of military construction documents, a change in the replacement cost factor could be justified. However, this action would be contrary to the general DUSD(I&E) guidance of using private sector data when available.

An increase in the cost factor based upon the high range of the Marshall and Swift valuation, rather than the middle of the range is clearly acceptable. This would satisfy DUSD (I&E) guidance and increase the present cost factor to \$1,598.20. An update to the Marshall and Swift unit costs is expected in December 2009, and may be received in time to affect Version 12.

Inclusion of features that are presently associated with other FACs or the "special bill" for dredging may not be advisable for the following reasons:

- A useable pier can, and is, constructed without utility systems. As pointed out in the Navy Audit Service report, designs are selected from an ala carte menu of utility systems, dependent upon the probable mix of ships to be berthed. It follows that no one utility system design can be viewed as an inherent part of the pier.
- The Navy currently inventories piers using 8 separate category codes, indicating a range of purposes and features.

- Including exterior utilities and dredging within the definition of FACs 1511 and 1512 would be contrary to existing definitions of existing exterior utility FACs and the dredging special bill.

Recommendation

Since the Navy is submitting, justifying and obtaining approval for projects with unit costs higher than a commercial unit price, it is recommended the average unit price from the military construction projects be used for Version 11, if there is still time to affect this change.

For Version 12, it is recommended the Marshall and Swift unit cost be reviewed and the higher of the MILCON or Marshall and Swift values be used as the conservative approach.

Recommended Replacement Cost Factor:	\$2,819.18 based on MILCON documents
Current (V11) Replacement Cost Factor	\$1,305.64 based on Marshall & Swift
Navy Audit Service Report Cost Factor	\$1,310.31 based on Michael Baker Study

Project Title		Shading	Navy											MCON		
	Indicates Project Increment		CatCode										OSD Selling	FY-08 Unit	Inflation	
Project Number				Location	Year	Primary Facility	Fender System	Primary Facility & Fender System	SF	SM	SY	Unit Cost	Price Based Index	Price	Rate to FY-09	
Pier 31 Replacement			15120	New London CT												
6VN Maintenance Pier Replacement			15250	Bremerton WA												
P464 Magnetic Silencing Facility Modification			15180	San Diego CA	2009	\$ 18,260,000		\$ 18,260,000	35,629		3,959	\$ 4,612.53	#N/A	\$ 4,613	1	
P356 Pier 11 Replacement			15120	Norfolk VA	2008	\$ 49,720,000		\$ 49,720,000	165,248		18,361	\$ 2,707.93	1	\$ 2,708	1.0204	
P135 Ship Repair Pier 3 Replacement			15250	Portsmouth VA	2008	\$ 3,740,000		\$ 3,740,000					1	\$ -	1.0204	
P094C General Purpose Berthing Pier Complex Increment 3			15120	Colts Neck NJ	2007	\$ 36,240,000		\$ 36,240,000	294,156		32,684	\$ 1,108.80	1.06097	\$ 1,176	1.0204	
P391A Replace Piers 44 -51 and Quay Wall			15220	Little Creek VA	2007	\$ 28,810,000	\$ 2,620,000	\$ 31,430,000		7,697	9,206	\$ 3,414.22	1.06097	\$ 3,622	1.0204	
P032B Pier 11 Replacement Increment 3			15120	Norfolk VA	2006	\$ 45,860,000		\$ 45,860,000	128,962		14,329	\$ 3,200.48	1.13486	\$ 3,632	1.0204	
P283 Pier 6 Replacement			15120	Groton CT	2006	\$ 1,960,000	\$ 3,980,000	\$ 5,940,000			-		1.13486	\$ -	1.0204	
P094B General Purpose Berthing Pier Complex Increment 2			15120	Colts Neck NJ	2006	\$ 36,240,000		\$ 36,240,000	294,156		32,684	\$ 1,108.80	1.13486			
P463 Pier 11 Replacement Increment 2			15120	Norfolk VA	2005	\$ 7,440,000	\$ 1,430,000	\$ 8,870,000	32,507		3,612	\$ 2,455.78	1.25175	\$ 3,074	1.0204	
P032A General Purpose Berthing Pier Replacement			15120	Earle NJ	2005	\$ 45,040,000		\$ 45,040,000	128,962		14,329	\$ 3,143.25	1.25175			
P094A Service Pier Upgrade and Building Addition			15120	Bangor WA	2005	\$ 36,240,000		\$ 36,240,000	294,156		32,684	\$ 1,108.80	1.25175			
P032 Replace Pier			15150	North Island CA	2004	\$ 45,040,000		\$ 45,040,000	128,962		14,329	\$ 3,143.25	1.36951			
P395 Pier Replacement Increment 2 (Pier 3, double deck)			15120	Norfolk VA	2004			\$ -			-		1.36951	\$ -	1.0204	
P137 Concrete Supply Pier			15160	San Nicholas Is	2003	\$ 3,240,000		\$ 3,240,000	12454		1,384	\$ 2,341.42	1.45012	\$ 3,395	1.0204	
P226A					2003	\$ 22,690,000		\$ 22,690,000		25,592	30,608	\$ 741.31	1.45012	\$ 1,075	1.0204	
P250 Replace Piers 10 and 11 (Increment 2)			15120	San Diego CA	2002	\$ 7,690,000		\$ 7,690,000	31000		3,444	\$ 2,232.58	1.45705	\$ 3,253	1.0204	
P326A Pier Replacement Increment 1 (Pier 3, double deck)			15120	Norfolk VA	2002	\$ 18,590,000	\$ 3,650,000	\$ 22,240,000	180091		20,010	\$ 1,111.44	1.45705	\$ 1,619	1.0204	
P226 Depurming Pier Replacement (30,853 LF)			15180	Norfolk VA	2002	\$ 22,690,000		\$ 22,690,000		25,592	30,608	\$ 741.31	1.45705			
P302 Pier Delta Replacement, Increment 2			15120	Bremerton WA	2002	\$ 1,880,000		\$ 1,880,000					1.45705	\$ -	1.0204	
P341A Berthing Pier Increment 1			15150	San Diego CA	2002	\$ 34,750,000		\$ 34,750,000	196,850		21,872	\$ 1,588.77	1.45705	\$ 2,315	1.0204	
P326 Pier Replacement Increment 1			15120	Bremerton WA	2001	\$ 18,590,000	\$ 3,650,000	\$ 22,240,000	174960		19,440	\$ 1,144.03	1.51034			
P341					2001	\$ 34,750,000		\$ 34,750,000		18,288	21,872	\$ 1,588.76	1.51034			
Shading Indicates Project Increment - most recent price used for average														Average Unit Price		

Square Meter to SY Conversion: | 1.196 |

Inflated to
FY-09

\$ 4,613
\$ 2,763
\$ 1,200
\$ 3,696
\$ 3,706
\$ 3,137
\$ 3,465
\$ 1,097
\$ 3,319
\$ 1,652
\$ 2,362
\$ 2,819.18