

# ARCHIVED REPORT

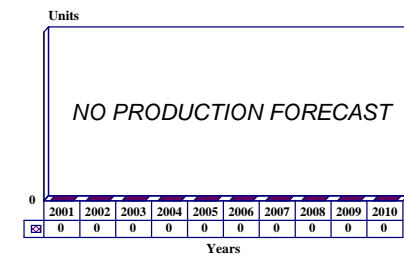
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## LSD-49 Harpers Ferry Class – Archived 11/2002

### Outlook

- No further construction planned
- Attention now shifted to LPD-17 and LHA(R) programs
- No export possibilities
- This report will be archived next year

10 Year Unit Production Forecast  
2001-2010



### Orientation

**Description.** Dock landing ships intended for the transport and disembarkation of heavy equipment and the logistics supplies in amphibious warfare.

#### Sponsor

US Navy  
Naval Sea Systems Command (NAVSEA)  
2531 Jefferson Davis Hwy  
Arlington, Virginia (VA) 22242-5160  
USA  
Tel: +1 703 602 6920

#### Contractors

Lockheed Shipbuilding & Construction  
Seattle, Washington (WA)  
USA  
(Original lead design and construction yard, builder of LSD-41-48)

Avondale Industries Inc, Shipyards Div  
PO Box 50280  
New Orleans, Louisiana (LA) 70150-0280  
USA  
Tel: +1 504 436 2121; 436 5393  
Fax: +1 504 436 5304; 436 5781; 436 5303  
Telex: 266070 avon ur  
(Final construction yard, builder of LSD-49-52)

Duramax Marine  
(Water-lubricated bearings and shaft sealing systems)

L-3 Communications – Power Paragon  
(Power distribution, control, magnetics and conversion systems)

Raytheon Systems Co  
(Phalanx CIWS)

SEMT Pielstick  
(high and medium speed diesel engines)

Thordon Bearings Inc  
(bearings)

**Status.** In service.

**Total Produced.** Twelve

**Pennant List**

<u>Ship</u>	<u>Builder</u>	<u>Launch Date</u>	<u>Commission Date</u>
LSD-41 <i>Whidbey Island</i>	Lockheed	6/1983	2/1985
LSD-42 <i>Germantown</i>	Lockheed	6/1984	2/1986
LSD-43 <i>Fort McHenry</i>	Lockheed	1/1986	8/1987
LSD-44 <i>Gunston Hall</i>	Avondale	6/1987	4/1989
LSD-45 <i>Comstock</i>	Avondale	1/1988	2/1990
LSD-46 <i>Tortuga</i>	Avondale	9/1988	11/1990
LSD-47 <i>Rushmore</i>	Avondale	5/1989	6/1991
LSD-48 <i>Ashland</i>	Avondale	11/1989	5/1992
LSD-49 <i>Harpers Ferry</i>	Avondale	1/1993	1/1995
LSD-50 <i>Carter Hall</i>	Avondale	10/1993	9/1995
LSD-51 <i>Oak Hill</i>	Avondale	6/1994	6/1996
LSD-52 <i>Pearl Harbor</i>	Avondale	2/1996	5/1998

**Mission.** These ships are designed for the transport and launch of amphibious craft and vehicles in amphibious assault operations, as well as for provision of limited docking and repair services for conventional and air cushion landing craft (LCAC).

**Price Range.** The unit cost of the Whidbey Island class ships was US\$238 million. The price of the LSD-49 class ships is US\$257.5 million each.

**Technical Data**

	<u>Metric</u>	<u>US</u>
<b>Dimensions</b>		
Length	185.9 m	609 ft 7 in
Beam	25.6 m	84 ft
Height	54.0 m	177 ft 2 in
Draft (Full Load)	6.3 m	20 ft 4 in
Vehicle Area	1,125 m <sup>2</sup>	12,500 ft <sup>2</sup>
Cargo Area	450 m <sup>3</sup>	5,000 ft <sup>3</sup>
<b>Displacement</b>		
Light	11,303 tonnes	11,125 tons
Full Load	16,976 tonnes	16,708 tons
<b>Performance</b>		
Speed	40 km/h	22 kts
Range	14,800 km at 33 km/h	8,000 nm at 18 kts
Crew	22 Officers, 327 Enlisted	
<b>Military Lift Capacity</b>		
Troops	Marines	402 (plus 102 surge troops)
Helicopter	Sikorsky CH-53D (platform only)	2
Landing Craft	LCAC/MCAC	2-3 (4 on LSD-41-47)
Cranes	20-ton, 60-ton	1+1
Vehicles	LCM-6 or LCU or AAV-7	21/3/64
Fuel	Aviation type	90 tons
<b>Armament</b>		
CIWS	20 mm Phalanx Mark 15	2
Light	25 mm L87 Mark 38	2

	<u>Type</u>	<u>Number</u>
Machine Guns	M-2HB 0.50 cal	6
Missile Launchers	RIM-116A Rolling Airframe Missile (RAM)	2
<b>Electronics</b>		
Radars		
Air Search	SPS-49	1
Surface Search	SPS-67	1
Navigation	SPS-64(V)9	1
Electronic Warfare		
ESM/ECM	SLQ-32(V)2	1
TACAN	URN 25	1
IFF	Mark XII UPX-29	1
Communications		
SATCOM	SRR-1	2
UHF	WSC-3	2
Chaff Launcher	Mk 36 SRBOC	4
<b>Machinery</b>		
Diesels	Colt-Pielstick 16PC25-V400	4x9,360 shp
Propellers	Controllable pitch, 13.5 ft dia.	2

**Design Features.** The LSD-41 Whidbey Island Class and the cargo version, the LSD-49 Harpers Ferry Class, differ from previous amphibious ships of the US Navy in several aspects, including their choice of propulsion engines and the expanded crew quarters. Diesel engines were chosen to give these ships a long-range capability with fuel economy. Habitability was improved in the new ships, with all accommodations being moved from the wing walls around the well deck to the large superstructure.

The Harpers Ferry class ships (LSD-49 onwards) are designed for larger cargo-carrying capacity than the first eight ships (LSD-41). However, they have about 90 percent parts commonality with the LSD-41 Whidbey Islands design.

**Operational Characteristics.** The LSD-41 and LSD-49 classes provide complementary round-out capabilities to the new fleet of LHD class helicopter carriers. While the LHDs provide a fast reaction, vertical envelopment component to an amphibious operation and can contribute substantial air support to the beached marines, it is the responsibility of the LSDs to carry and land the heavy armor essential to expand and exploit a beachhead. The LSD-41 class ships fulfill this requirement satisfactorily. The LSD-49 does sacrifice some of the heavy vehicle lift capability in favor of additional capacity for the supplies, essential to support and operate the vehicles when ashore.

The new ships have the SLQ-32(V)2 system, providing a self-defense electronic warfare capability. There also

are two Mark 36 SRBOC countermeasures launchers. Previous LSD ships carried two to four three-inch L50 Mark 33 twin gun mounts. These have been replaced in the LSD-41 class by two Mark 15 Phalanx Close-In Weapons System mounts. In place of the two 50-ton-capacity cranes aboard previous LSD ships, the LSD-41 class has one 60-ton- and one 20-ton-capacity crane. This combination was chosen due to studies showing that many loads were less than 50 tons and did not need the larger crane, while other loads had to be broken up to be picked up by 50-ton-capacity cranes.

The new ships do not have the mezzanine deck common to earlier LSD ships, which allowed tanks to drive from the well deck to the mezzanine and then up a ramp to the flight deck. The LSD-41 ships have a series of ramps allowing vehicles to be driven into the superstructure, turned around and driven onto the flight deck. There is no helicopter hangar, but two CH-53E Sea Stallion helicopters can be operated simultaneously.

The tactical function of the LSD-41/49 class(es) is also quite different from that of their predecessors. The US amphibious strategy now relies heavily on the use of the LCAC to deliver payloads to the beach from over the horizon. The LCAC is primarily concerned with the transport of cargo, troops and land vehicles as well as some fuel. Replenishment will be provided by other, larger ships, while the units deployed on LCACs are expected to set up basic logistical structures on the shore, and on-shore replenishment facilities are a realistic alternative.

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## Variants/Upgrades

LSD-41 Whidbey Island Class. This is the basic LSD design used to transport troops to amphibious landings. There are two minor variations of this design. From LSD-44 on, the ships have a collective protection system to protect them against nuclear fallout and chemical and biological agents. Also, the LSD-47 and LSD-48 have two 25 mm L87 Mark 38 Bushmaster cannon in place of two Mark 67 20 mm cannon. This modification will be extended to all other ships of the type.

LSD-49 Harpers Ferry Class. This is the Cargo Variant (LSD-CV) used mainly to transport military equipment and support cargoes. This type was first ordered in FY88. The Harpers Ferry variant has a shorter well deck, providing room for only two LCACs in place of the four carried by the original LSD-41. The resulting space is used for larger cargo loads (trucks, tanks, heavy vehicles and miscellaneous amphibious support supplies). The Harpers Ferry variant has less troop capacity than the LSD-41 type, but the carrying capacity is increased to 1,169 m<sup>2</sup> (12,989 ft<sup>2</sup>) for vehicles and 3,641.7 m<sup>3</sup> (40,464 ft<sup>3</sup>) for cargo. Only one crane is provided, as opposed to the LSD-41's two.

The cargo version represents only a minimum modification to the original LSD-41 design. Other differences include additional air-conditioning, piping, and hull structure. Also, the forward-mounted Phalanx gun is forward of the bridge, whereas on the LSD-41 it is on top of the bridge.

Quick Reaction Combat Capability Upgrade. The Navy plans to upgrade the self-defense capabilities of seven key warship classes, with respect to the changing future warfare scenario. This will entail increased activity in the littoral environments, dealing with over-the-horizon attack and supply logistics to coastal areas that are shallower than the areas where the Navy has traditionally placed its greatest emphasis. The LSD-41 class ships were the first to obtain the quick reaction combat capability, followed by the DD-963 AEGIS destroyers and the LHD-1 amphibious landing craft.

The LSD-41 QRCC upgrade will include interfaces with the SPS-67 surface search radar, Central Identification Friend or Foe Ship Defense (CIFF-SD), SLQ-32A EW system, Navigation/Sensor System Interface (NAVSSI), Mk 15 Phalanx CIWS, and the Mk 31 RAM (Rolling Airframe Missile). All twelve LSD-41 and LSD-49 class ships are to receive the system by 2002.

SSDS Backfit. All ships of both the Whidbey Island and Harpers Ferry classes (LSD-41-52) are expected to receive the Ship Self-Defense System (SSDS) capability upgrade in due course. The system was first demonstrated on LSD-41 in 1993. LSD-52 was backfitted with it; the anticipated completion date for the others is 2002.

Smart Ship Testbed. USS *Rushmore* (LSD-47) is being used as a testbed for the new Smart Ship technologies, which is intended to allow reducing the number of crew onboard, thanks to a higher degree of automation.

## Program Review

**Background.** With the advent of the Rapid Deployment Force during the late 1970s, the US Navy began modernizing its amphibious warfare fleet. A major consideration was the design of a new Dock Landing Ship (LSD) program. Of the 13 LSDs in commission at the time, eight were more than 20 years old and would have to be retired from service during the mid-to-late 1980s.

At the same time, the USN was developing the LCAC/MCAC (Landing Craft, Air Cushion), which had a much greater speed, range and payload than earlier landing craft. Most of the Navy's LSDs could operate,

at best, only three LCACs, and then with difficulty. The requirement was formulated for an LSD that would be capable of carrying and conducting repairs on the new landing craft.

The LSD-41 originally appeared in the Navy's FY78 Five-Year Shipbuilding Plan. This announced the Navy's intent to begin funding construction of the new class in FY79, followed by two in FY81 and three in FY82. When the FY79 budget was submitted, no funding request for the LSD-41 was included. The program suffered a further setback in January 1979 when the FY80 budget and Five-Year Plan were

submitted to Congress. In that plan, the LSD-41 was dropped entirely, apparently to allow further assessment of the requirement to deploy the new LCAC.

Because US Marine Corps and Navy testimony was very critical of the decision to postpone or drop the LSD-41 program, Congress added US\$41 million to the budget to provide for long-lead funding of the ship. LSD-41 contract design, funded by program element number 64567N, was completed in June 1979. The FY80 program focused on developing the LSD-41 powerplant, and Lockheed Shipbuilding received a US\$2.9 million contract for ship system design. In February 1980, the Navy awarded Lockheed a further US\$38.3 million for advance procurement of long-lead items for the lead ship of the class. In FY81, the Navy requested and received funding for the lead ship of the class. This led to the award of a US\$338.6 million contract to Lockheed for LSD-41.

The Navy's requested funding for the second ship of the class in FY82 was authorized by Congress. In March 1982, Lockheed received a US\$304 million increase to its previous contracts for construction of the second ship, the LSD-42. The Navy received funding for LSD-43 in the FY83 budget and awarded Lockheed a US\$62.8 million long-lead material contract and a US\$271.4 million construction contract in January 1983.

In FY84, the Navy considered the LSD-41 class as a potential program for a multi-year contract, but this was rejected. Instead, the class was put out for competitive bids. Four firms competed for the second source contract: Avondale Shipyards, Ingalls Shipbuilding, General Dynamics (Quincy), and National Steel & Shipbuilding.

Funding for LSD-44 was requested in the FY84 budget, and this was approved with minor changes by Congress. The Navy selected Avondale as the second-source for the class and awarded the firm a US\$416.6 million contract for construction of the LSD-44. The FY84 budget also contained long-lead funding for the LSD-45 and LSD-46. In March 1984, Avondale received a US\$58.6 million contract increase to its initial contract to provide long-lead material for LSD-45 and LSD-46. In November 1984, Avondale received a US\$306.7 million contract for LSD-45 and LSD-46. This contract also had options for the LSD-47 and LSD-48 ships. The Navy requested and received US\$489 million for these ships in its FY85 budget.

The Navy FY86 budget request included US\$414.4 million for the LSD-41 program. Congress gave the service US\$403.4 million. On December 11, 1985, the Navy exercised the FY85 contract option and gave Avondale US\$237.3 million for the LSD-47 and

LSD-48. The Navy did not ask for any LSD-41 class funding in the FY87 budget. In mid-1987, Lockheed Shipbuilding filed for bankruptcy and closed down. The Navy requested US\$311 million in FY88 for a variant of the new class, the LSD-41 cargo variant. The LSD-49, which had been in the FY86 Five-Year Plan, was omitted from the FY87 Five-Year Plan. In its place was the new LSD-41 cargo variant. This was a modified version of the LSD-41 design, carrying more cargo but fewer LCACs. The Navy's FY88 budget request included US\$324.2 million for LSD-49, the first cargo variant ship.

The House of Representatives voted to approve the Navy's request for the first LSD-41(CV) in FY88. The Senate voted to deny the service funding for the ship. However, Congress eventually voted to give the Navy US\$258 million for the LSD-49. Avondale Shipyards received a US\$157.4 million contract (N00024-88C-2048) for design and construction of LSD-49 on June 17, 1988. The contract called on Avondale to supply associated technical manuals, planning yard services, drawings, studies and Coordinated Ships Allowance List material. Eight shipyards were solicited for the bidding, but only four responded: Avondale, National Steel and Shipbuilding, Ingalls, and Pennsylvania Shipbuilding.

The Navy requested funding for one LSD-49 in the FY90 budget and one in the FY91 projected budget. The Navy's FY91 Four-Year Plan called for ordering one LSD-41(CV) per year from FY91 through FY95. This would give a total of six LSD ships of the CV design, the same number as in previous Navy plans. In its latest Six-Year Shipbuilding Plan, USN has not forecast the procurement of any additional ships of this class. The original plan was for six of the cargo variants; however, it now appears that only four will be procured. In the FY93 budget markup, the program cost was reduced by 38.3 percent. The funding was reduced from US\$1.34 billion to US\$824.7 million. This cut was accomplished by reducing the buy to three ships from five. Subsequently, one of the eliminated ships, the LSD-52, was restored as the USS *Pearl Harbor*. She was delivered to the USN in April 1998.

The order for LSD-52 brought the program to its end. There are currently no plans to order any additional ships of this class. This could be reversed only if the LPD-17 class is severely delayed or canceled, in which case additional LSD-41 or LSD-41(CV) ships may be ordered as an alternative. This is not a likely scenario, however, and no additional orders for ships of this class are foreseen. The LPD-17 will be the new major platform for missions of this ship type in the future, and it will be one of the major tools used for operating in the littoral warfare environment as well as for

operations involving joint missions between the Navy and the Marines.

Towards the end of the LSD-49 program, much debate arose concerning the capabilities of the projected new LPD-17 amphibious warfare ship in comparison to those of the Harpers Ferry class. Upgrading the capabilities of the Harpers Ferries was considered as an alternative to procuring a larger, more expensive LPD-17. However, the design changes required to make this scheme practical were extensive enough to

render the program economically non-viable, and the suggestion was dropped. Procurement of the LPD-17, now known as the San Antonio Class, was executed. Consequently, the number of Harpers Ferry class ships was limited to four, concluding with LSD-52 in 1998.

This situation has not changed, and the Whidbey Island/Harpers Ferry class program has now concluded. No further construction is likely, and as a result, this report will be archived next year.

## Funding

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The Whidbey Island and Harpers Ferry classes have been funded by the US Navy.

The US Navy requested US\$324.2 million to fund the first cargo variant of the series. The ship, LSD-49, was authorized and funded in the US Department of Defense Fiscal Year 1988 budget, the LSD-50 in the FY89, and LSD-51 in the FY91 budget. Authorization for LSD-52 was obtained in FY92, but it was not ordered until October 12, 1993.

## Recent Contracts

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<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Fairbanks Morse Engine	20.0+	1994 – Avondale subcontract for four propulsion and four power-generation diesel engines for the LSD-52.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1975	US Navy began planning new class of LSDs
	1978	Design studies completed. Class included in Navy's Five-Year Plan
Jun	1979	Detail design of LSD-41 completed
	1980	Congress added funds to budget for LSD-41
Feb	1980	USN awarded Lockheed contract for long-lead items
Aug	1981	Keel laid for LSD-41
Feb	1985	USN announced LSD-41 program will end with LSD-48
Feb	1986	USN announced LSD-41(CV) program (a.k.a. LSD-49)
Jun	1988	First LSD-41(CV) ordered
	1993	SSDS successfully demonstrated on LSD-41
Jan	1995	USS <i>Harpers Ferry</i> commissioned
May	1998	Delivery of last of series, LSD-52 <i>Pearl Harbor</i>
	2002	Projected completion date for backfitting SSDS on entire class

## Worldwide Distribution

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US (eight LSD and four LSD-CV)

## Forecast Rationale

The Whidbey Island and Harper's Ferry class provide the heavy-lift and transport component of the amphibious lift capability required for a US Marine Corps Expeditionary Unit (MEU). With the reshaping of the US armed forces into a more rapidly deployable and mobile mode, their role is likely to be enhanced rather than diminished. Indeed, the demand for vehicle-and cargo-lifting capability may actually increase with some proposals to restructure USMC formations. However, given the pressing financial strictures facing the US Navy and the high priority of other programs, any re-opening of the production line for these ships is highly improbable.

These ships are also highly specialized for the requirements of the US Navy. Other fleets requiring new ships of this type are likely to design and build their own equivalents optimized for their specific needs. This is the option taken by the British, French, Dutch, and Spanish. These countries are those that possess a

powerful, well-equipped and numerically strong Marine Corps. Implicit in the construction of LSDs is a level of foreign commitments that justify the provision of a serious heavy lift amphibious warfare capability. Put together, few countries have such requirements. Those that do not, but have more limited aims, find smaller amphibious ships or those purchased second hand will fulfill their needs at lower cost.

The Whidbey island and Harpers Ferry classes will see substantial upgrades as they are refitted with "Smart Gator" improvements and enhanced self-defense capabilities. These upgrades reflect the need to drive down operating costs as well as the increased level of risk to amphibious warfare combatants resulting from mines, gun and missile coastal batteries and other threats specific to the littoral environment. However no further construction is likely, and as a result, this report will be archived next year.

## Ten-Year Outlook

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No new production is projected – only modernization and upgrade activity of the onboard systems will continue throughout the forecasting period; the forecast chart is therefore omitted.

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