CH-53E The Navy/Marine Heavy Transport Helicopter

SIKORSKY AIRCRAFT Division of UNITED TECHNOLOGIES

First flight — March 1, 1974

CH-53E Navy/Marine Heavy Lift Multi-Purpose Transport

The CH-53E adds heavy lift capability to a combat-proven assault transport helicopter. It doubles the lift and greatly extends the range of the current CH-53D.

The CH-53E:

- Provides amphibious forces with the heavy lift support needed in the heliborne assault, and subsequent operations ashore.

- Augments the fixed wing Carrier On-board Delivery (COD) system and provides Vertical On-board Delivery (VOD) service to other ships at sea that are unable to be resupplied by COD.

- Solves the problem of retrieving disabled aircraft and equipment from the battlefield, and removing dud aircraft from congested carrier decks.

- Provides a solution to the future problems of moving containerized cargo at sea to support the sea-based amphibious forces.

The CH-53E combines heavy lift capability with full amphibious ship basing compatibility, and extensive commonality with the CH-53D and RH-53D, currently operational with the U.S. Marine Corps and U.S. Navy.

Derived from a Distinguished Line

CH-53E is the natural descendant of a line of distinguished combat veterans.

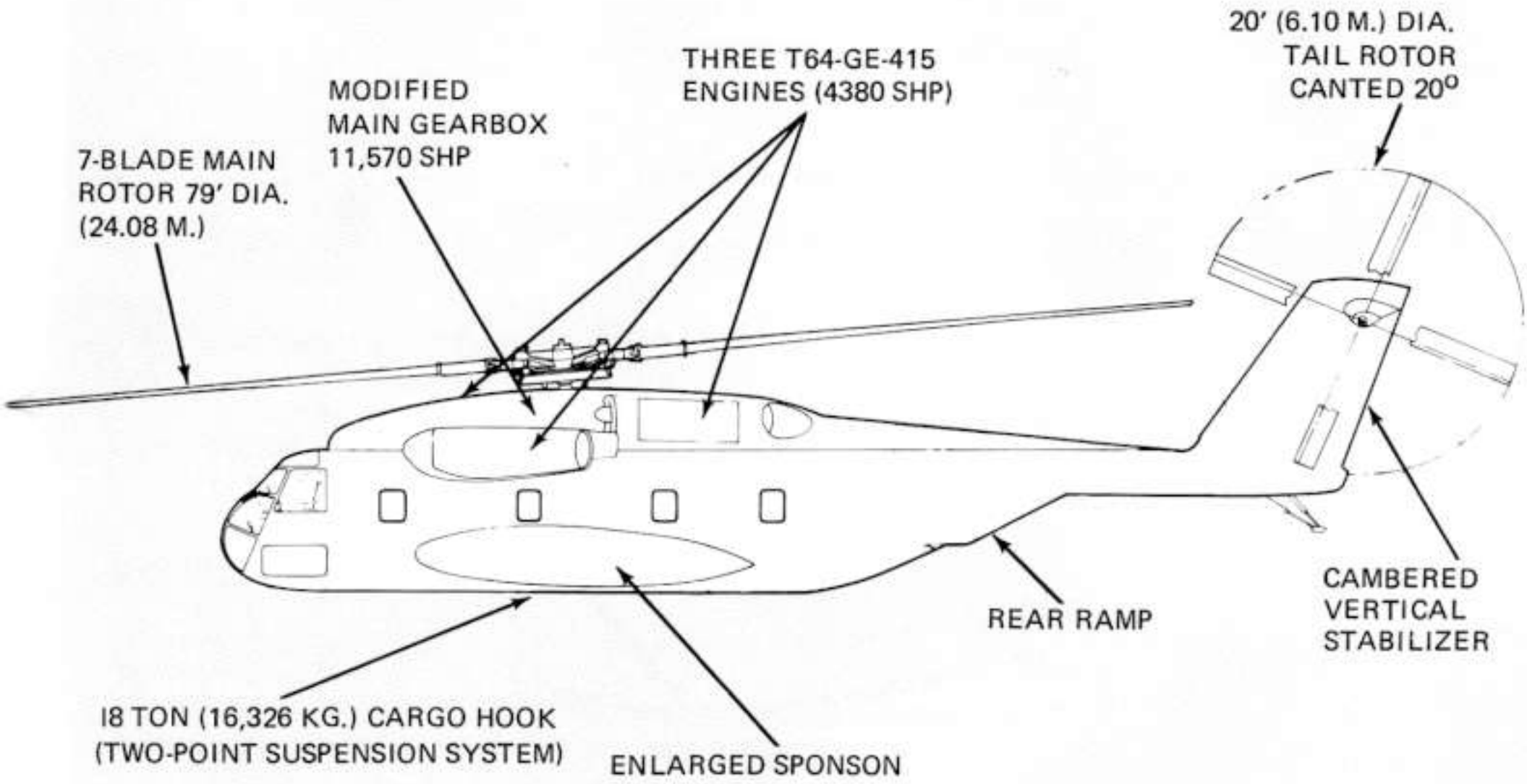
CH-53A - 1964
TWO T64-GE-6 (2850 SHP)

HH-53B - 1967
TWO T64-GE-3 (3080 SHP)

HH-53C - 1968
TWO T64-GE-7 (3435 SHP)

CH-53D - 1969
TWO T64-GE-413 (3925 SHP)

CH-53E Key Design Features



External Cargo

Amphibious Assault

Marine studies of combat operations in Vietnam and scenarios of potential combat areas have highlighted the vulnerability of heliborne assault forces against a mechanized enemy.

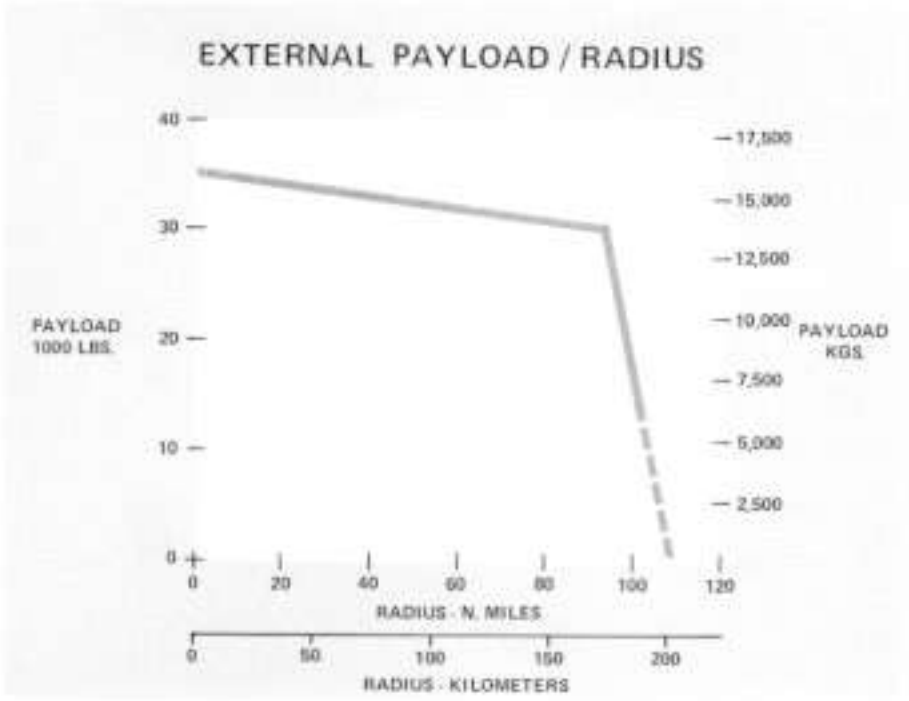
The CH-53E, with its 16 ton external payload capability over a 50-nautical-mile radius, provides the lift required for:

- Weapons
- Vehicles
- Engineering Equipment

It has hovered at a gross weight of 71,700 lbs. with a payload of 18 tons.

It can be deployed with the initial heliborne force, regardless of beach or other surface restrictions.

In subsequent operations ashore, the CH-53E provides rapid redeployment for the same equipment and vehicles, in addition to providing an expeditious, cost-effective mode of resupply.



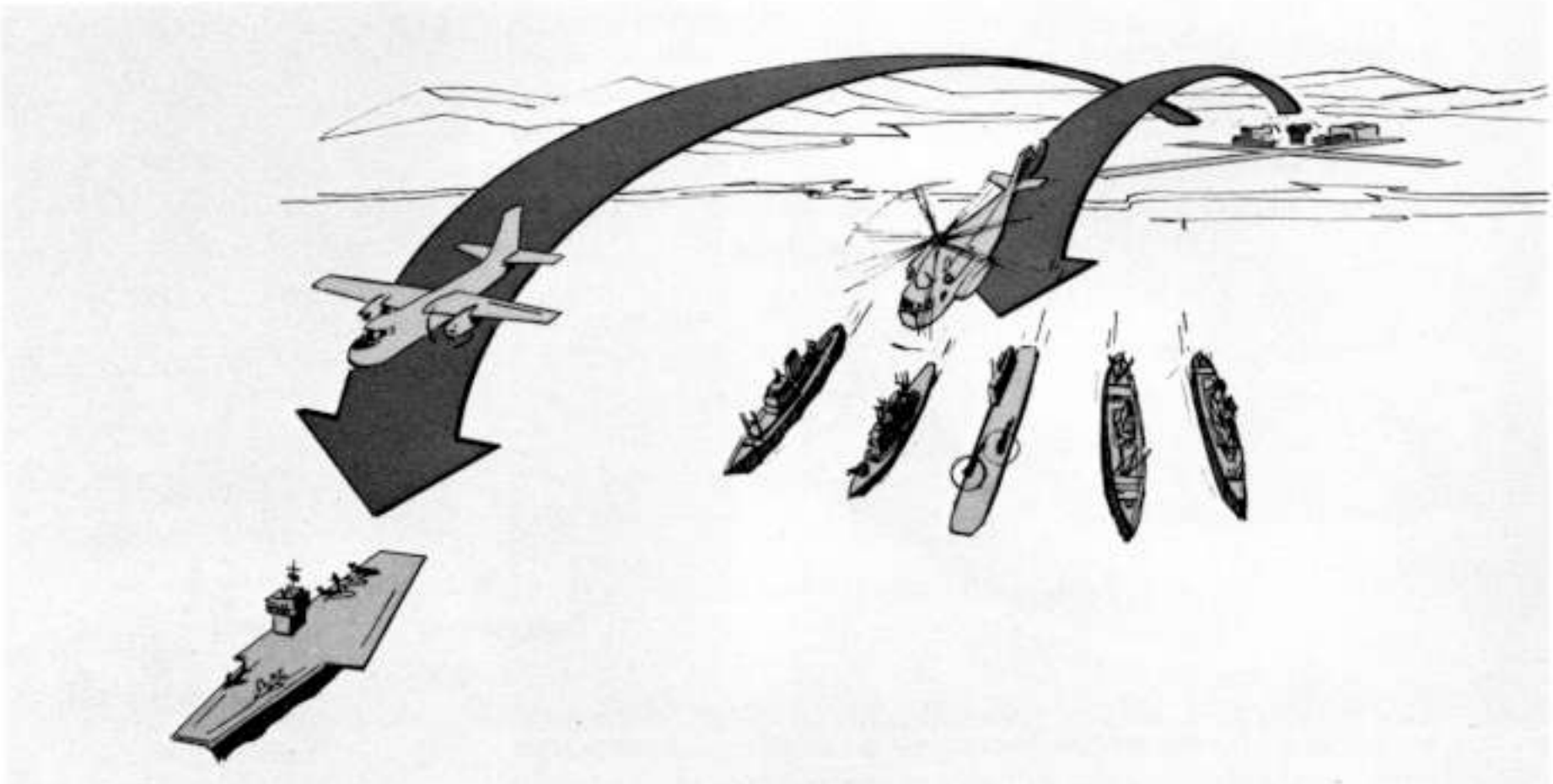
Aircraft and Equipment Retrieval

Wherever military operations are conducted, the presence of a helicopter capable of retrieving disabled or battle-damaged aircraft or vehicles has resulted in savings of millions of dollars, often exceeding the procurement cost of the retrieving aircraft.

In amphibious operations, the CH-53E can retrieve any damaged Marine helicopter or tactical aircraft and transport it 50 nautical miles (93 km.) to safety without disassembly.

At sea, the CH-53E can quickly clear a carrier deck of disabled aircraft by lifting them to another ship, rapidly restoring the carrier to full combat readiness.

The CH-53E is capable of retrieving its own weight, another CH-53E, which adds a new dimension of flexibility to the retrieval task.



Vertical Onboard Delivery

In the past, carrier task forces have enjoyed the services of Carrier Onboard Delivery, receiving men, high priority supplies, needed spare parts, and mail directly by fixed-wing aircraft, immediately upon arrival in the operating area.

Now, the CH-53E, with its extended range and increased payload, can provide this valuable service to virtually all ships afloat, without the need for a carrier deck or the cargo restraints necessary for arrested landings of fixed wing aircraft.

The CH-53E ideally complements the C-1 and C-2 fixed wing aircraft of the COD service, matching their high standards of rapid response and dependable delivery.

Payload/Range

Unmatched Performance

The cabin of the CH-53E is 30 ft. (9.14 m.) long, 6½ ft. (1.98 m.) high and 7½ ft. (2.29 m.) wide and can accommodate up to 7 standard 40" x 48" (1.01 m. x 1.22 m.) pallets; or 55 passengers. Rapid loading of heavy items is assisted by the full-width rear ramp, roller floor, and tie-down fittings throughout the cabin. Using the cargo winch, one man can load palletized cargo at the rate of 2,000 lbs. (907 kgs.) per minute.

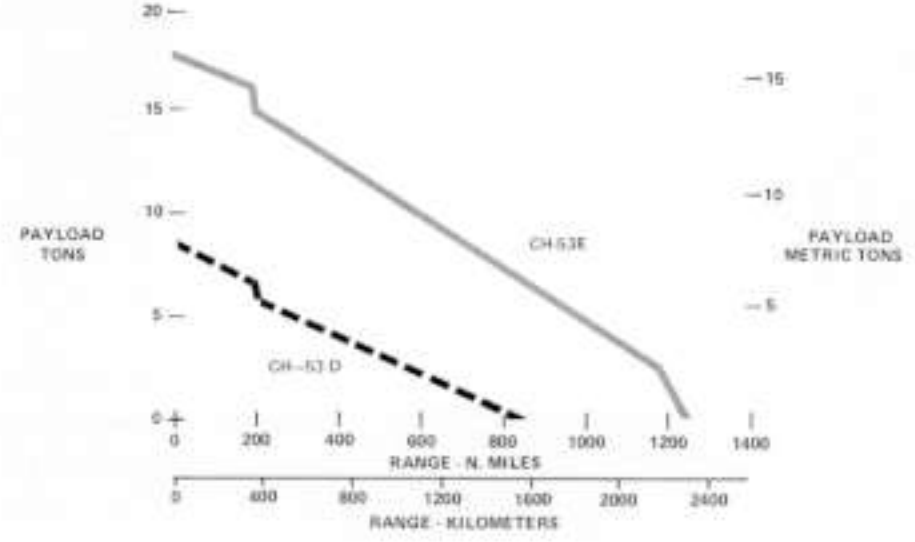
J-79 engines can be carried internally.

Payloads up to 5 tons (4,535 kg.) can be delivered out to a range of 900 nautical miles (1,668 km.), cruising at 150 knots (278 km./hr.) with full internal payload, and up to 170 knots (315 km./hr.) when empty.

Refueling may be conducted on shore or on ship's deck using pressure or gravity equipment. Provisions for ship-to-air (HIFR) and air-to-air refueling permit flights limited only by crew endurance.

CH-53A/D Interior

INTERNAL PAYLOAD / RANGE



Container

Ship to Shore

By 1977, more than 75% of U.S. cargo is expected to be containerized. Currently containerships cannot transfer loaded cargo containers to a combat area that does not have extensive terminal facilities.

In a contingency requiring U.S. presence on foreign soil, the CH-53E provides an aerial bridge, shuttling containerized supplies directly from offshore ships to the user inland.

The CH-53E provides

- Rapid response
- Flexibility
- Complete recoverability during retrograde of equipment and supplies
- Heavy lift capability integral to the Amphibious Task Force.

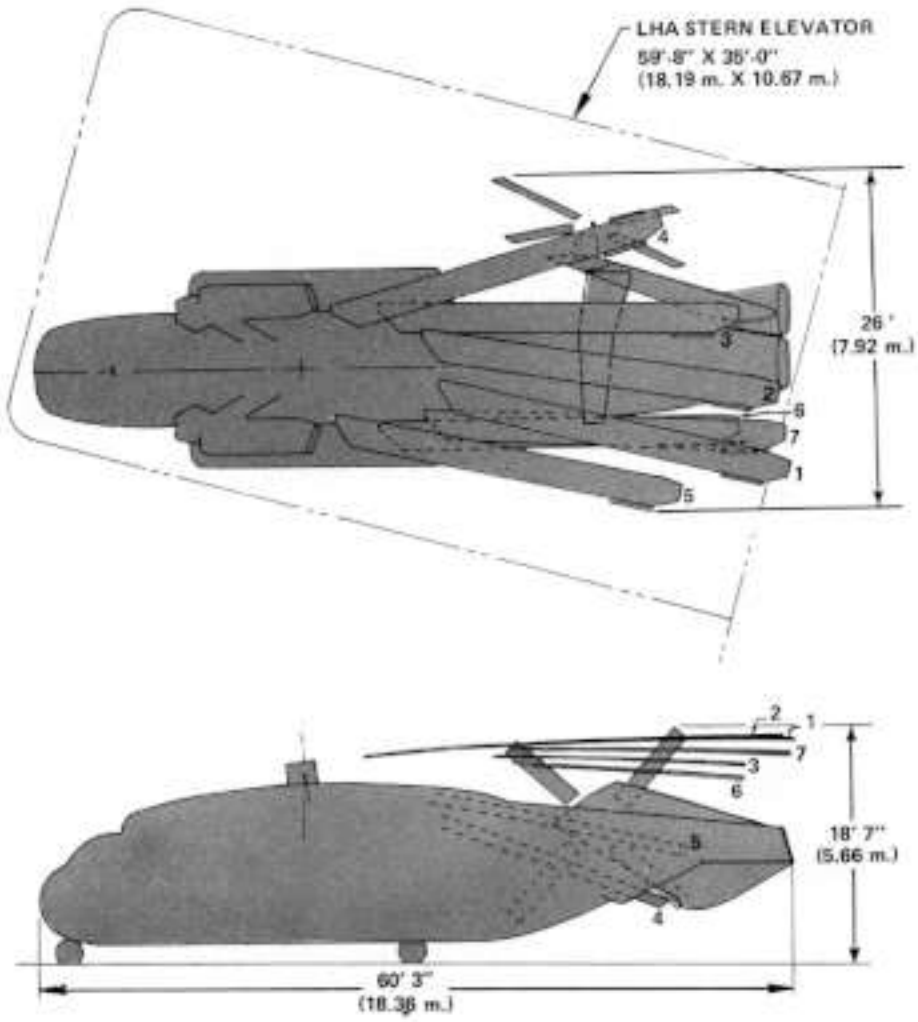
Logistics

Ship to Ship

In any future major conflict, service fleet activities will include transferring containerized supplies--on the open sea--from the deck of a delivering commercial containership to the deck of a ship returning to the combat area. The containership has neither the capability nor the equipment to handle such a transfer.

Again, CH-53E provides the method.

Temporarily based ashore, or on the decks of replenishment ships, the CH-53E can lift loaded containers from underway containerships for delivery to stores ships, amphibious resupply ships or combat units. Piers, tugs, floating cranes and lighters are unnecessary.



Ship Compatibility

Equipped with powered main rotor and tail pylon fold systems, the CH-53E is fully compatible with basing aboard LPH and LHA amphibious ships. It can conduct routine operations from the flight decks of the LPD, LSD and LST ships of the Amphibious Task Force with no ship modification required.

In a folded configuration, the CH-53E occupies only 10% more space than a folded CH-53D, while providing more than twice the lift capability.

The CH-53E can be made operationally flight ready from the stowed to flight configuration in less than 2 minutes. All primary flight systems can be fully checked with the aircraft in the stowed configuration.

The versatility of the CH-53E is demonstrated by its capability to land and take off from the flight decks of AOE's and AOR's of the service fleet.

The CH-53E provides:

- Commonality with ship support of RH-53 and CH-53, already available on the LPH and LHA.
- Full maintainability aboard the LPH and LHA.
- Increased total amphibious lift capability.
- Increased shipboard productivity and flexibility.
- No requirement for ship modifications.

CH-53A/D

Reliability and

PROPULSION SYSTEM TEST BED

- The CH-53E incorporates design features providing high reliability combined with ease of maintenance unprecedented on large helicopters.
- BIM® blade inspection system provides instant cockpit indication of rotor blade spar integrity.
- An in-flight diagnostic system is planned to provide automatic inspection and diagnosis, and the collection of historical trend data for component life predictions.
- In-cockpit monitoring of critical fluid levels.
- The Propulsion System Test Bed has completed 439 hours of endurance testing on the CH-53E's entire dynamic system through Phase I.

Maintainability

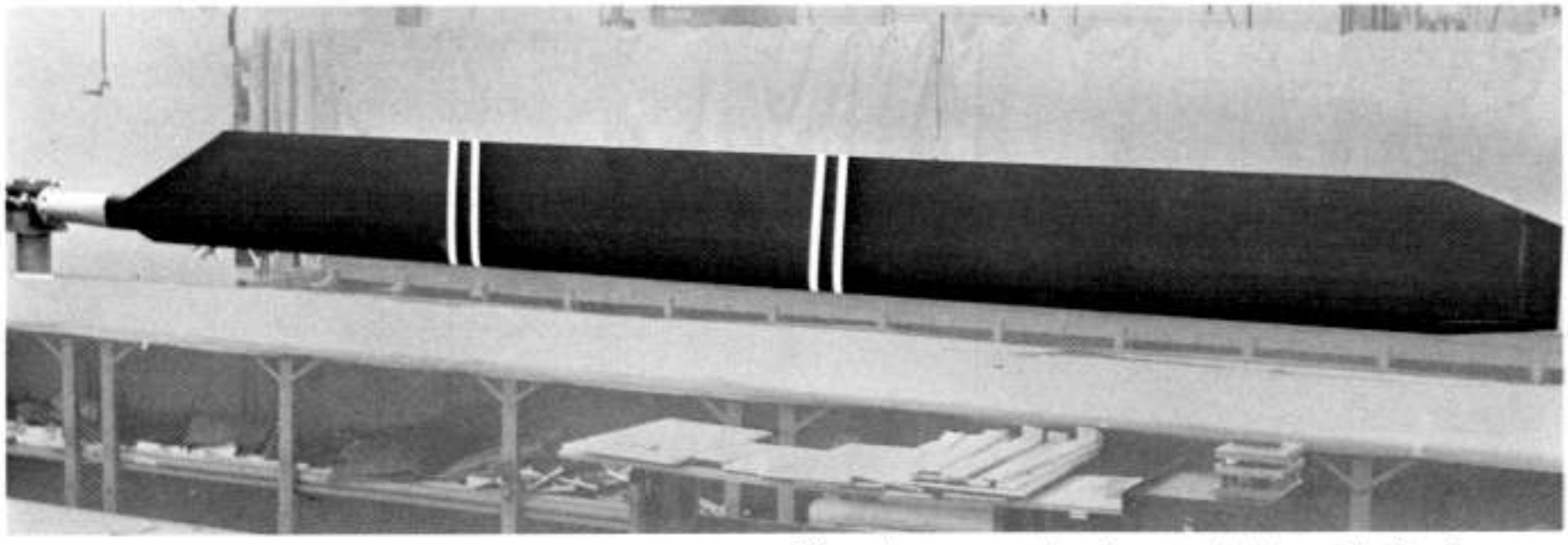
Continuous component development programs build up time between overhauls (TBOs) for all major dynamic components.

Main and tail rotor blades are removed "on condition" only, with no fixed TBO or component life.

Titanium spar, Nomex® trailing edge and fiberglass covered main rotor blades provide increased main rotor durability.

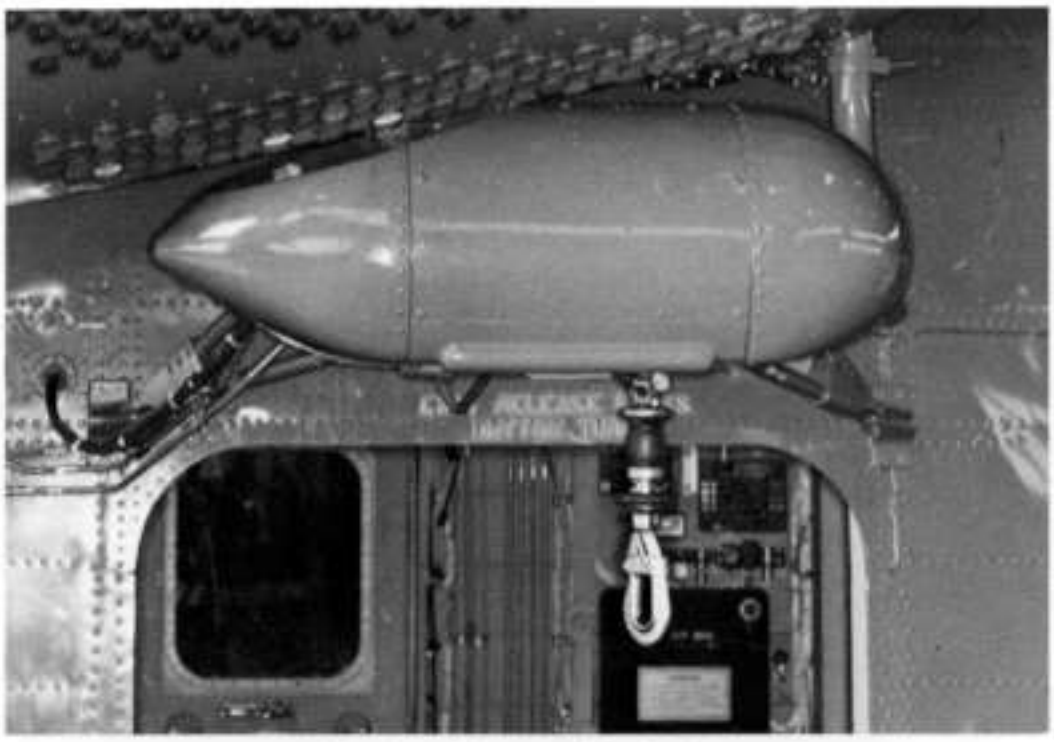
CH-53E Projected Component TBOs

	Hours
Main Gear Box	2,000
Nose Gear Box	2,000
Accessory Gear Box	2,000
Intermediate Gear Box	2,000
Tail Rotor Gear Box	2,000
Main Rotor Head	2,000
Tail Rotor Head	2,000
Generator	2,000

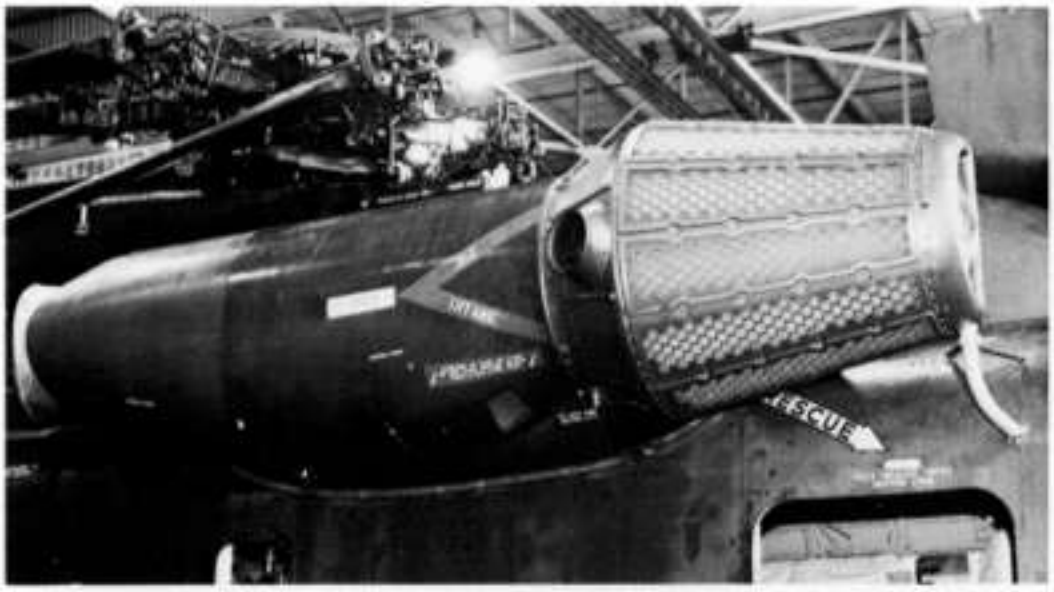


Fiberglass covered main rotor blade with titanium spar

Special Mission Features



Typical Rescue Hoist Installation...RH-53D

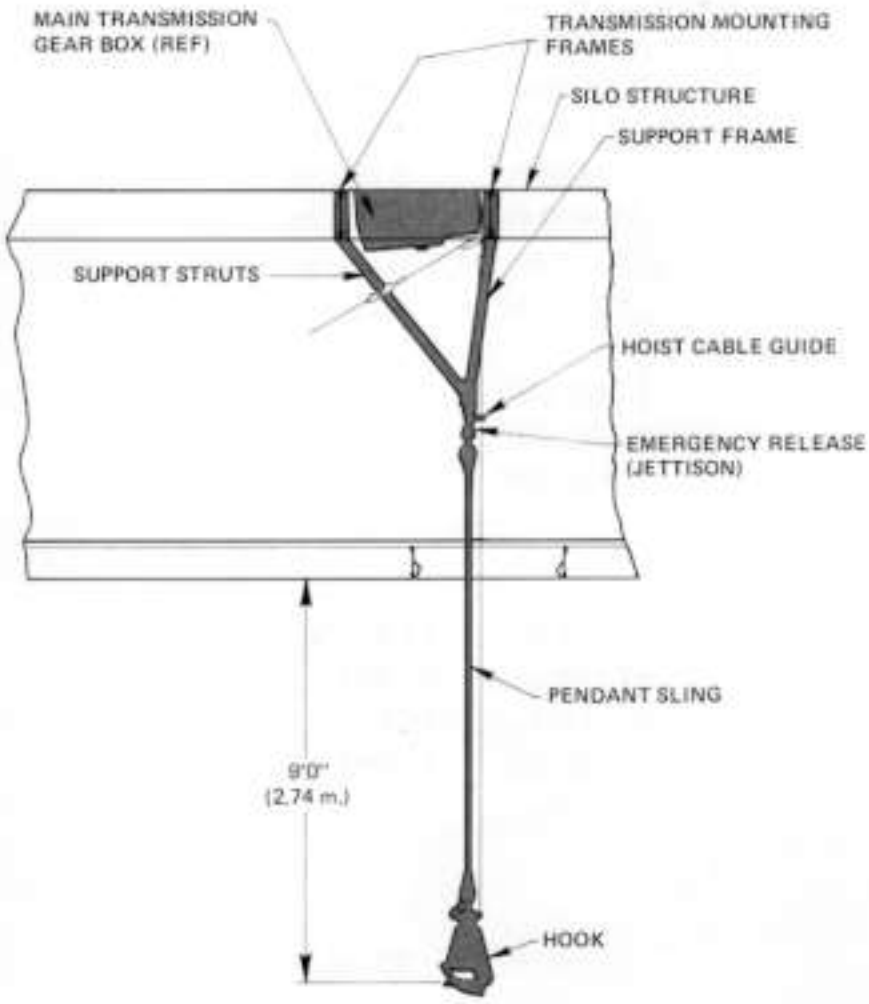


Typical EAPS Installation...CH-53A/D

The CH-53E incorporates mission-oriented features to meet the requirements of a wide variety of operating environments.

- Rescue hoist
- Engine air particle separators (EAPS)
- Emergency water landing capability
- Towing/MCM provisions
- External cargo hook
- Pressure (single point) or gravity refueling (multi-point)
- 650 gal. (2460 liter) external auxiliary fuel tanks
- Ship/air (HIFR) refuel capability
- In-flight refueling capability
- Armor and armament

CH-53E Cargo Hook



RH-53D In-Flight Refueling

RH-53D with 2460 liters (650 Gal.) Auxiliary Fuel Tank

CH-53A/D In Tow Mission

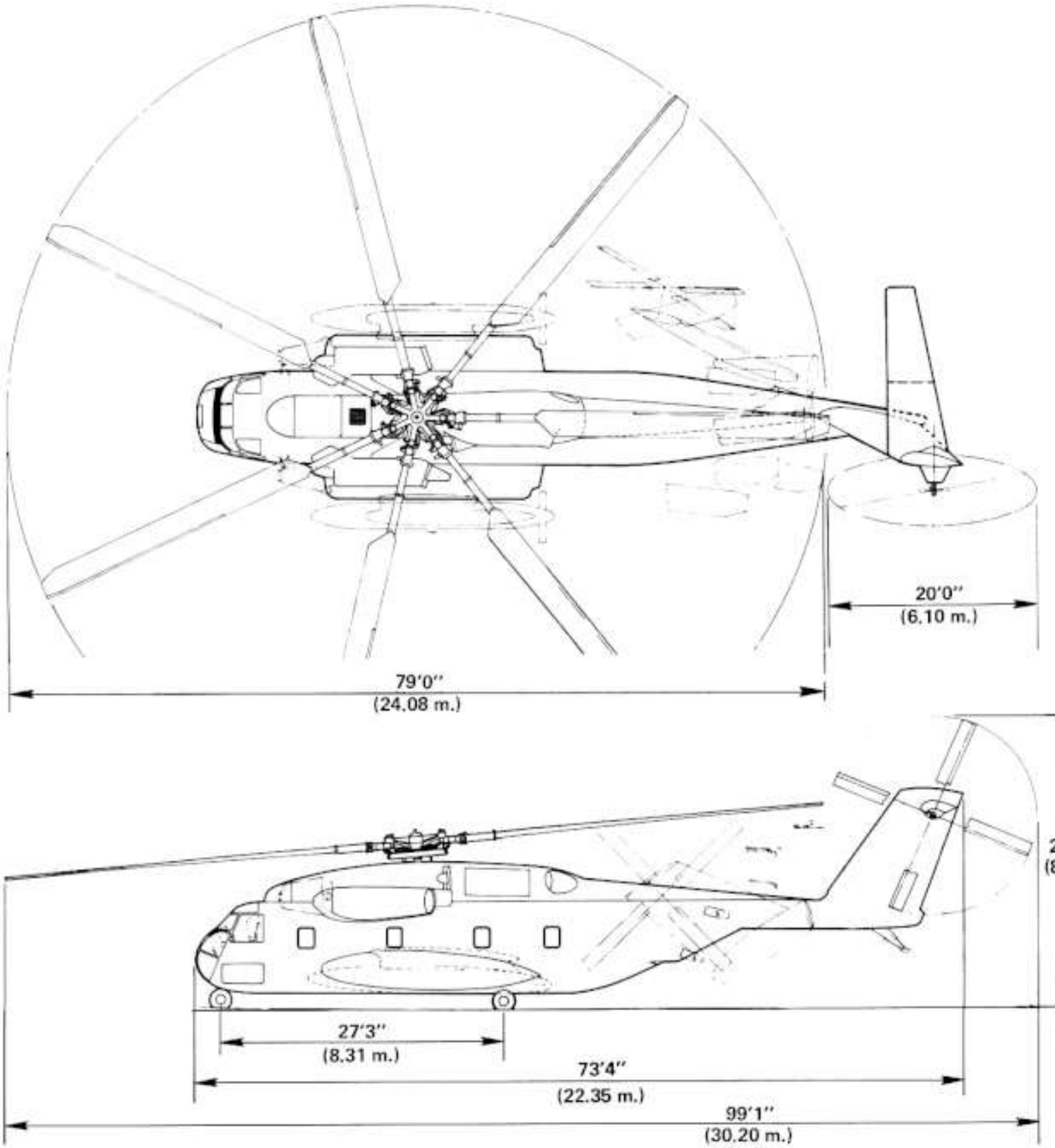
CH-53E Specifications

Performance	English	Metric
High speed (SL)	170 kts.	315 km./hr.
Cruise speed (SL)	150 kts.	278 km./hr.
Best rate of climb (int. power)	2380 fpm.	12.1 m./sec.
Hover ceiling (IGE) (max. power)	10,720 ft.	3,270 m.
Hover ceiling (OGE) (max. power)	7480 ft.	2,280 m.
Service ceiling (max. cont. power)	12,400 ft.	3,780 m.
Fuel consumption (cruise)	3230 lb./hr.	1,470 kg./hr.
Range @ V_{BR}	266 n.mi.	493 km.
Engines: - Three T64-GE-415		
Maximum rating (10 min.)	4,380 SHP	
Intermediate rating (30 min.)	4,145 SHP	
Max. cont. rating	3,696 SHP	

Weights		
Weight empty	32,048 lbs.	14,533 kg.
Maximum design gross weight	69,750 lbs.	31,631 kg.
Internal payload (100 n.mi. rad.)	30,000 lbs.	13,605 kg.
External payload (50 n.mi. rad.)	32,200 lbs.	14,603 kg.

Dimensions		
Operational		
Overall Length	99'1"	30.19 m.
Overall height	27'9"	8.45 m.
Fuselage length	73'5"	22.38 m.
Fuselage width	8'10"	2.69 m.
Main rotor diameter	79'0"	24.08 m.
Tail rotor diameter	20'0"	6.10 m.
Tread	13'0"	3.96 m.
Wheel base	27'3"	8.30 m.
Folded (pylon/main rotor)		
Overall length	60'3"	18.36 m.
Overall width	25'9"	7.85 m.
Overall height	18'2"	5.51 m.
Internal		
Cabin length	30'0"	9.14 m.
Cabin width	7'6"	2.29 m.
Cabin height	6'6"	1.98 m.
Seating capacity		
Crew	3	
Troops	55	


13'0"
(3.96 m.)


20'0"
(6.10 m.)
79'0"
(24.08 m.)
28'5"
(8.66 m.)
27'3"
(8.31 m.)
73'4"
(22.35 m.)
99'1"
(30.20 m.)

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