NAVAIR 00-110AH53-2

Standard Aircraft Characteristics

NAVY MODEL
CH-53D
AIRCRAFT

PUBLISHED BY DIRECTION OF THE
COMMANDER OF THE NAVAL AIR SYSTEMS COMMAND

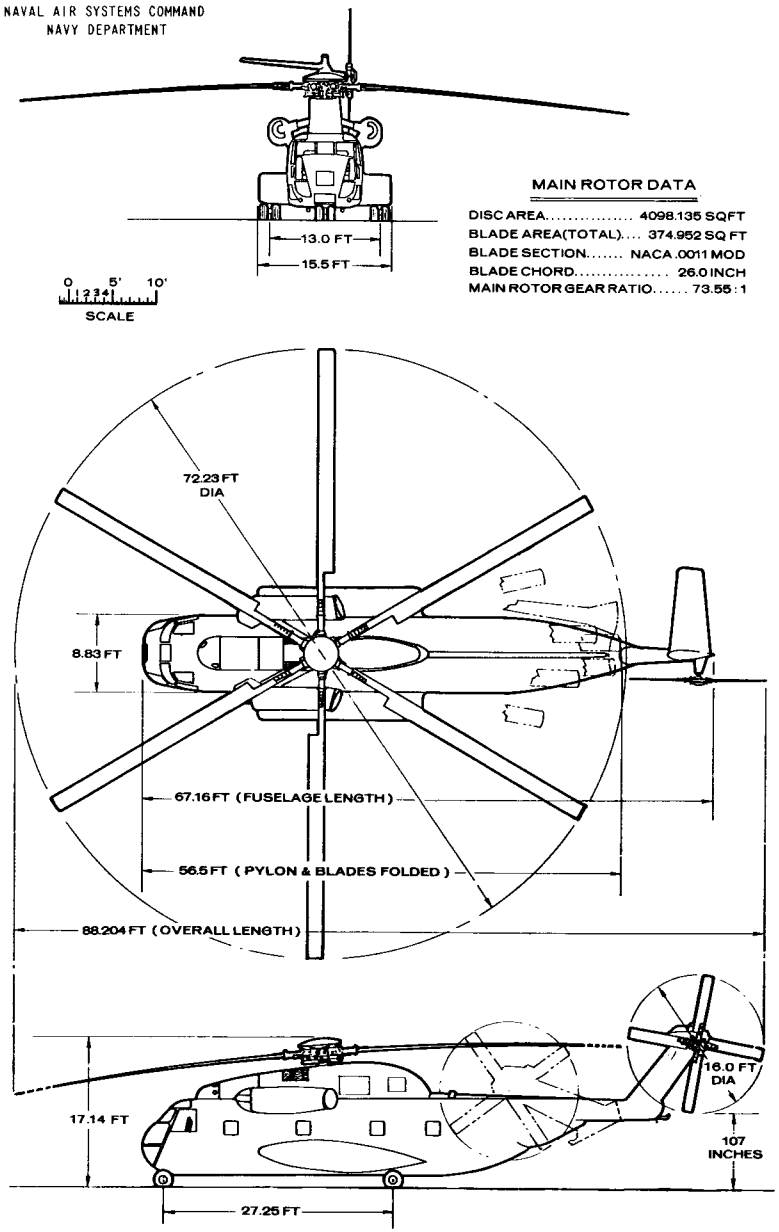
JUNE 1971

STANDARD AIRCRAFT CHARACTERISTICS

CH-53D

SIKORSKY

NAVAL AIR SYSTEMS COMMAND
NAVY DEPARTMENT

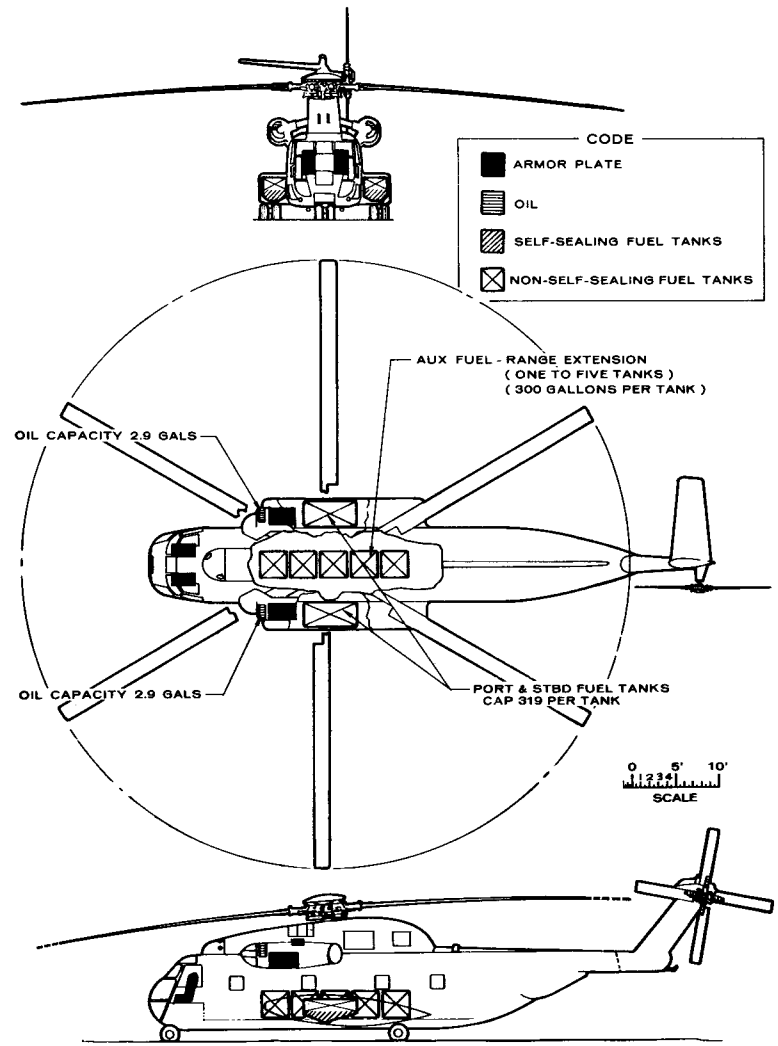


MAIN ROTOR DATA

DISC AREA	4098.135 SQFT
BLADE AREA(TOTAL)	374.952 SQ FT
BLADE SECTION	NACA .0011 MOD
BLADE CHORD	26.0 INCH
MAIN ROTOR GEAR RATIO	73.55 : 1

DESCRIPTIVE ARRANGEMENT

NAVAL AIR SYSTEMS COMMAND
NAVY DEPARTMENT



ARMAMENT AND TANKAGE

POWER PLANT

No. and Model: (2)T64-GE-413
Manufacturer: General Electric
Engine Spec. No.: E1159(19 March 1969)
Type: Axial
Length: 78.8 inches
Diameter: 23.8 inches
Gear Ratio (Eng/Rotor) 73.55 to 1

RATINGS

S. L. STATIC	SHP	RPM	MIN.
Max.	*3925	13600	10
Military	3695	13600	30
Normal	3230	13600	Cont.

* See Note Performance Summary page for transmission ratings.

ELECTRONICS

AN/ARC-51A Radio Set (UHF)
AN/ARN-52 Tacan Navigation Set
AN/APX-64 IFF Transponder Set
AN/ARC-94 Radio Set
AN/ARN-59 ADF
AN/ARC-54 or 131 Radio Set (VHF)
AN/AIC-14 Interphone System
AN/APN-154 Radar Beacon Set
AN/APN-171 Radar Altimeter
ID-351 or 387/ARN Course Indicator
ID-663A/U or B/U or C/U Bearing Distance Heading Indicator

MISSION AND DESCRIPTION

Primarily designed as an assault transport, the helicopter is employed in the movement of cargo and equipment and in the transportation of troops. When appropriately equipped, it may be used in the recovery of downed aircraft and personnel, performing mine countermeasure missions, and towing of vehicles and ships.

The twin turbine engine helicopter uses a single main rotor and a single anti-torque tail rotor. The blades are all metal construction. Main rotor blades are equipped with Sikorsky BIM® to eliminate mandatory blade retirement. Conventional helicopter controls are provided for both pilot and copilot. The mechanical controls are augmented by two parallel and independent hydraulic servo systems. An automatic flight control system (AFCS) is also provided. Landing gear is retractable. Main rotor blades and tail pylon fold for stowage aboard an aircraft carrier. To facilitate cargo loading, the aircraft is equipped with a hydraulically operated rear ramp, two cargo winches, roller conveyors, and tie-down facilities.

DEVELOPMENT

First Flight: ---------- 27 January 1969
First Service Use: ---------- 7 March 1969
Production Status: ---------- In Production

DIMENSIONS

Main Rotor Dia.----------72'-2.8"
Length (blades & pylon folded)----------56'-6"
Height (blades & pylon folded)----------17'-1.7"
No. of Blades, main---------- 6
Blade Area (each)----------62.5 sq. ft.
Disc Area----------4098.1 sq. ft.
Main Wheel Tread----------13'-0"
Max. Width (Main Blades and Pylon Folded)------15'-6"

WEIGHTS

LOADING	POUNDS	L.F.
Empty (A)	23628	
Basic	23634	
Design	33500	3.0
**Design Alternate	42000	2.39
*Combat	34958	
*Take-off	36693	

(A) Actual
* For Basic Mission
** ECP 6144 Part II

FUEL AND OIL

LOCATION	NO. TANKS	GAL.
L. Sponson*	1	319
R. Sponson*	1	319
Cabin**	5	1500
	TOTAL	2138

Grade ---------- JP-4, JP-5
Specification----------MIL-J-5624D
*Bottom third self-sealing
**Aux. tanks for range extension

OIL

Nacelles ---------- 2 (tot. 5.8)
Specification----------MIL-L-23699

ACCOMMODATIONS

Crew (Normal) 3
Cargo (basic mission)---------- 8000 lb.
or
Cargo (overload mission) ---------- 12742 lb.
or
Troops---------- 38
or
Litters---------- 24

Cabin Size Clearance:
Length ---------- 30'-0"
Height ---------- 6'-6"
Width ---------- 7'-6"

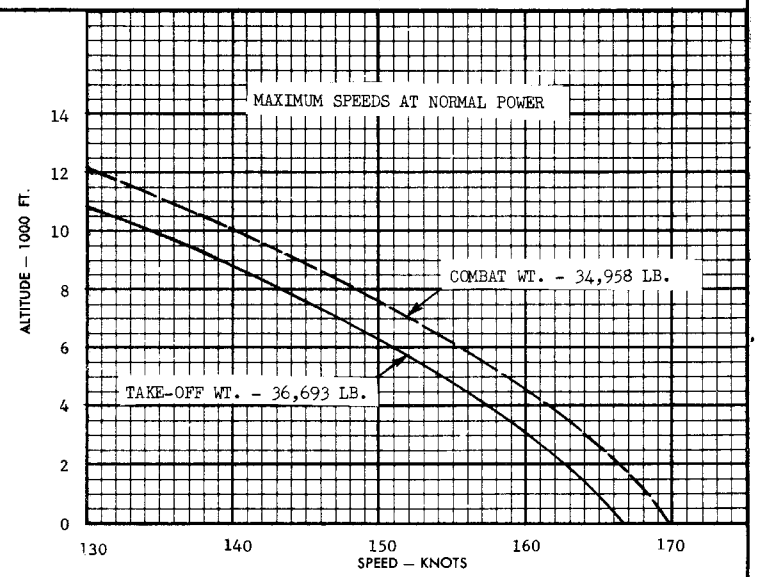
PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION		BASIC ASSAULT MISSION I	OVERLOAD ASSAULT MISSION II	COMBAT RANGE MISSION III	FERRY RANGE MISSION IV	RETRIEVAL (TROPICAL DAY)* MISSION V
TAKE-OFF WEIGHT	LB.	36693	41435	36693	41513	28693
FUEL	LB.	4338	4338	4338	14538	4338
PAYLOAD	LB.	8000/4000	12742/4000	8000/0	0/0	0/9289**
DISC LOADING	LB./SQ.FT.	8.95	10.11	8.95	10.23	7.00
VERTICAL RATE OF CLIMB AT S.L. (B/C)	FPM.	1590/1740	580/840	1590/1740	560/820	2110/2325
ABSOLUTE HOVERING CEILING (B/C)	FT.	6250/7200	1700/2900	6250/7200	1650/2850	7900/8900
MAX. RATE OF CLIMB AT S.L. (A/B)	FPM.	2180/2460	1845/2160	2180/2460	1855/2150	2320/2710
SERVICE CEILING (100 FPM.) (A)	FT.	16750	13350	16750	13300	17500
SPEED AT S.L. (A)	KN.	166	158	166	157	172
MAX. SPEED/ALTITUDE (A)	KN./FT.	166/S.L.	158/S.L.	166/S.L.	127/8000	169/3000
COMBAT RANGE	N.MI.	---	---	228	886	---
AVERAGE CRUISING SPEED	KN.	---	---	140	135	---
CRUISING ALTITUDE	FT.	---	---	0	8000	---
COMBAT RADIUS	N.MI.	100	95	---	---	106
AVERAGE CRUISING SPEED	KN.	150	150	---	---	138
Cruising altitude	FT.	0	0	---	---	3000
Total-mission time	HRS.	1.48	1.40	1.63	6.62	1.55

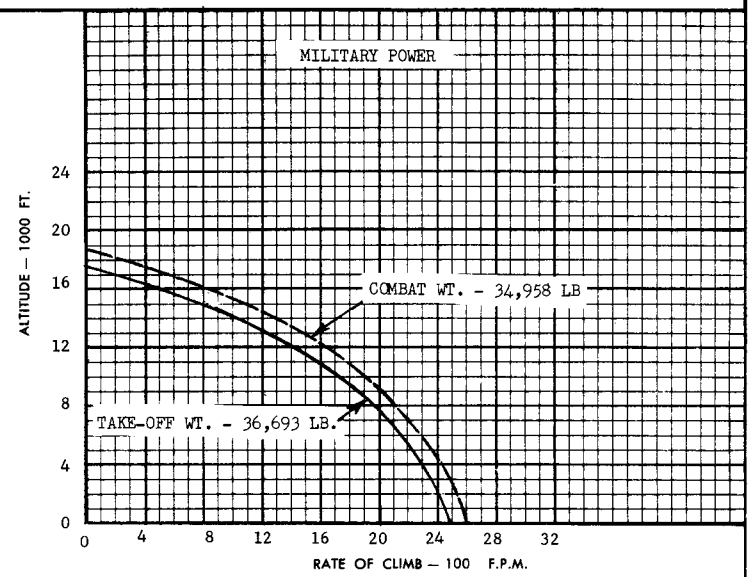
NOTES:
(A) Normal power
(B) Military power
(C) Maximum power
* Tropical Day: 91.5°F. at 3000 ft. cruise altitude.
** Inbound payload is carried externally (Δf = 35 sq. ft.)

Performance Basis:
(1) ICAO Standard conditions (except Mission V), no wind, no ground effect.
(2) Calculated data based on Navy flight tests on CH-53A helicopter.
(3) Range and radius based on General Electric specification fuel consumption data using fuel grade JP-5.
(4) Fuel consumption data are increased 5% above engine specification values.
(5) Transmission ratings are 7560 HP dual engine and 3780 HP single engine operation.
(6) Aircraft red line airspeed is 170 knots IAS.
(7) Weight data based on "Actual Weight and Balance Report", SER-65575 dated 10 March 1970.
(8) Performance reference: Sikorsky Report, SER-65583, "Substantiating Data for Standard Aircraft Characteristics and Performance Charts for CH-53D Helicopter."

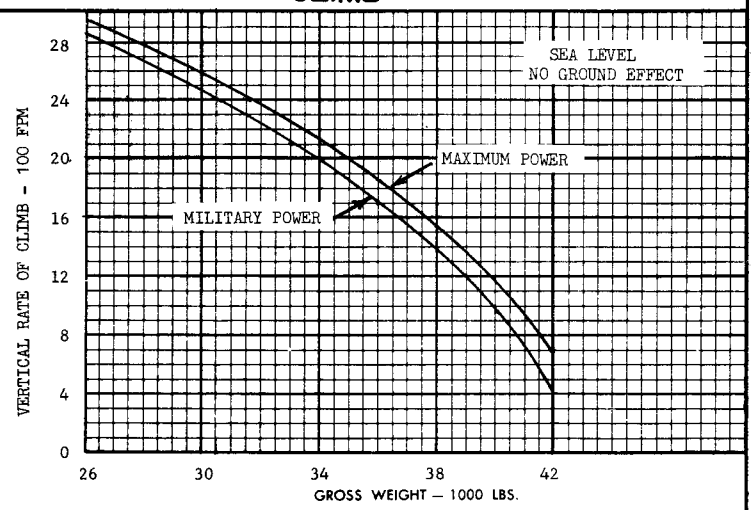
SPEED



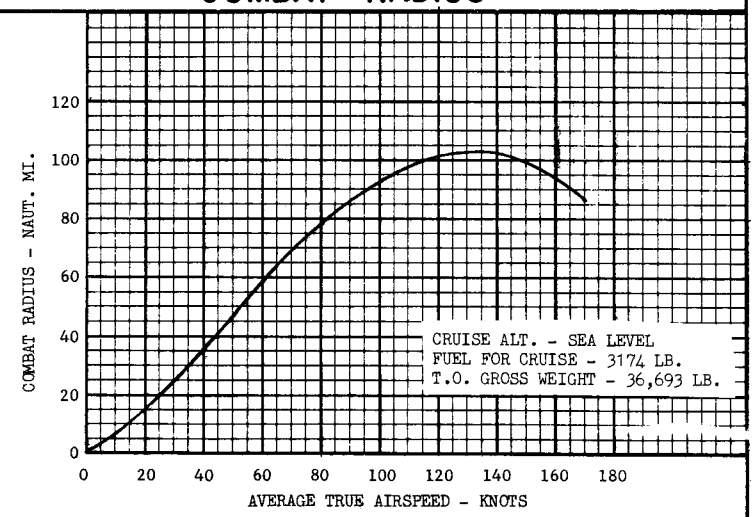
CLIMB



CLIMB



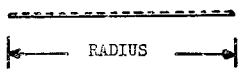
COMBAT RADIUS



NOTES

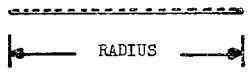
BASIC ASSAULT

Warm-Up & Take-Off: 2 min. at S.L., NRP
Cruise Out: At 150 kts. airspeed at S.L. to remote base
Hover Over Remote Base: At S.L. out of ground effect, for 10 min.
Land At Remote Base: Discharge 8000 lbs. and accept 4000 lbs. for return
Warm-Up & Take-Off: 2 min. at S.L., NRP
Cruise Back: At 150 kts. airspeed at S.L.
Reserve: 10% of initial fuel load



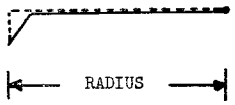
OVERLOAD ASSAULT

Warm-Up & Take-Off: 2 min. at S.L., NRP
Cruise Out: At 150 kts. airspeed at S.L. to remote base
Hover Over Remote Base: At S.L. out of ground effect for 10 min.
Land At Remote Base: Discharge 12,742 lbs. and accept 4000 lbs. for return
Warm-Up & Take-Off: 2 min. at S.L., NRP
Cruise Back: At 150 kts. airspeed at S.L.
Reserve: 10% of initial fuel load



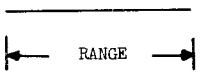
DUD RETRIEVAL (TROPICAL DAY)

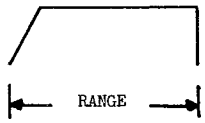
Warm-Up & Take-Off: 5 min. at S.L., 90°F, NRP
Climb: On course to 3000 ft. 91.5°F with Mil power
Cruise Out: At best range speeds to remote base
Hover Over Base: Out of ground effect, at 3000 ft., 91.5°F for 10 min. Pick up external maximum payload (O.G.E. hover, $\Delta f = 35\ ft^2$)
Cruise Back: At best range speeds 3000 ft., 91.5°F
Descend: To S.L. (no fuel used, no distance gained)
Reserve: 10% of initial fuel load



COMBAT RANGE

Warm-Up & Take-Off: 5 min. at S.L., NRP
Cruise Out: At S.L. at best range speeds until reserve fuel remains
Reserve: 10% of initial fuel load



FERRY RANGE

Warm-Up & Take-Off: 5 min. at S.L., NRP
Climb: On course to 8000 ft. with Mil power
Cruise Out: At best range speeds until reserve fuel remains
Descend: To S.L. (no fuel used, no distance gained)
Reserve: 10% of initial fuel load