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HELICOPTER FLYING QUALITIES CHARACTERISTICS-CH-46E
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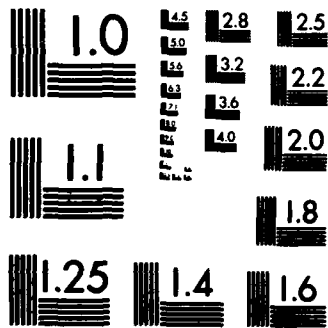
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REPORT NO. NADC-81118-60



HELICOPTER FLYING QUALITIES CHARACTERISTICS-CH-46E VOLUME 2

BOEING VERTOL CO.
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3 OCTOBER 1983

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Warminster, PA 18974

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) CH-46E; Helicopter; Flying Qualities		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This document defines the flying qualities characteristics of the CH-46E helicopter. The data are representative of both the metal-bladed and composite-bladed versions. Analytically computed static trim data are presented for a wide range of configurations (gross weight, c.g.) and flight conditions (airspeed, altitude, sideslip, climb, autorotation). Correlation of trim data with available flight test data is provided for validation. (see next page)		

20. ABSTRACT (continued)

Analytically computed static stability and control derivatives are compiled for significant combinations of configuration and flight condition. Time history data relating to dynamic stability, control response and SAS failures are extracted from flight test records obtained during the Contractor's CH-46E SLEP II flight test program.

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A tilted rectangular stamp or label with a grid pattern. It contains some faint text and a handwritten 'A-1' in a box. The text is mostly illegible but appears to include 'A-1' in a box at the bottom left.

VOLUME 2

CH-46E TRIM CHARACTERISTICS

↳ This Volume contains plotted trim data obtained from the Boeing Vertol Tandem Rotor Trim and Stability Analysis Program (A-97) for the CH-46E helicopter.

A catalog of the flight conditions at which the trim characteristics were determined is given on Page 2. Data for the following flight regimes are presented.

↳ Level flight, from 40 knots rearward to envelope-limited maximum forward speed, at sea level and at service ceiling for the two gross weights considered.

↳ Maximum power climb and autorotation, from 60 knots to 120 knots at sea level, and from 70 knots to envelope-limited maximum speed at service ceiling, for two gross weights.

↳ Constant altitude sideslips, at sea level, to ± 45 deg at 50 knots, ± 30 deg at intermediate speed, and to power-limited sideslip angle at high speed, for two gross weights.

↳ Sideward flight, to 45 knots left and right at sea level, for two gross weights.

↳ For each flight regime considered, the four cockpit control positions, plus helicopter pitch and roll attitudes, are plotted vs. airspeed or sideslip angle.

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CATALOG OF TRIM FLIGHT CONDITIONS
A97 TRIM ANALYSIS FOR CH-46E

Figure 1	Level Flight	Page 3
	24300 lb., 6 in. fwd, 0 ft.	
	24300 lb., 13 in. fwd, 0 ft.	
	24300 lb., 6 in. fwd, 8000 ft.	
Figure 2	Level Flight	Page 6
	17500 lb., 20 in. aft, 0 ft.	
	17500 lb., 40 in. fwd, 0 ft.	
	17500 lb., 20 in. aft, 14000 ft.	
Figure 3	Max. Power Climb and Autorotation	Page 9
	24300 lb., 6 in. fwd, 0 ft.	
	24300 lb., 6 in. fwd, 8000 ft.	
Figure 4	Max. Power Climb and Autorotation	Page 12
	17500 lb., 20 in. aft, 0 ft.	
	17500 lb., 20 in. aft, 14000 ft.	
Figure 5	Sideslip	Page 15
	24300 lb., 6 in. fwd, 0 ft., 50 kt	
	24300 lb., 6 in. fwd, 0 ft., 90 kt	
	24300 lb., 6 in. fwd, 0 ft., 130 kt	
Figure 6	Sideslip	Page 18
	17500 lb., 20 in. aft, 0 ft., 50 kt	
	17500 lb., 20 in. aft, 0 ft., 95 kt	
	17500 lb., 20 in. aft, 0 ft., 140 kt	
Figure 7	Sideward Flight	Page 21
	24300 lb., 6 in. fwd, 0 ft.	
	17500 lb., 20 in. aft, 0 ft.	

CH-46E TRIM CHARACTERISTICS
LEVEL FLIGHT

DCPT ON	○	CU	24300 LB	CG	6 IN FWD	HD	0 FT
SAS ON	□	CU	24300 LB	CG	13 IN FWD	HD	0 FT
TRIM	△	CU	24300 LB	CG	6 IN FWD	HD	2000 FT

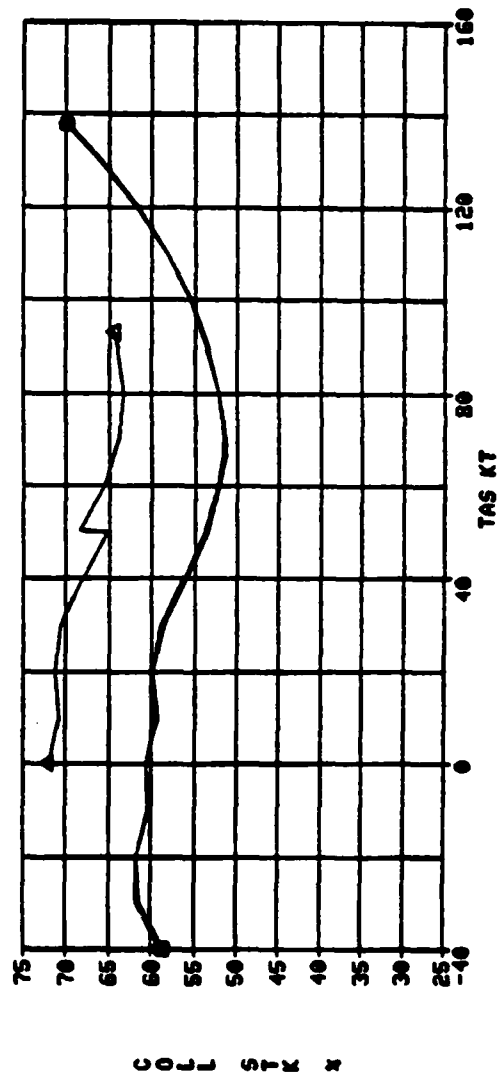
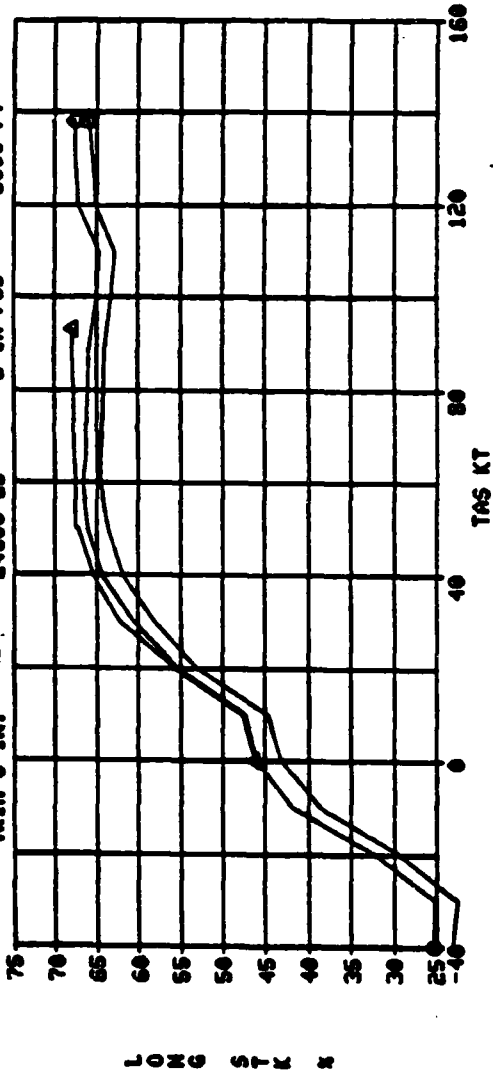


FIGURE 1A

CH-46E TRIM CHARACTERISTICS
LEVEL FLIGHT

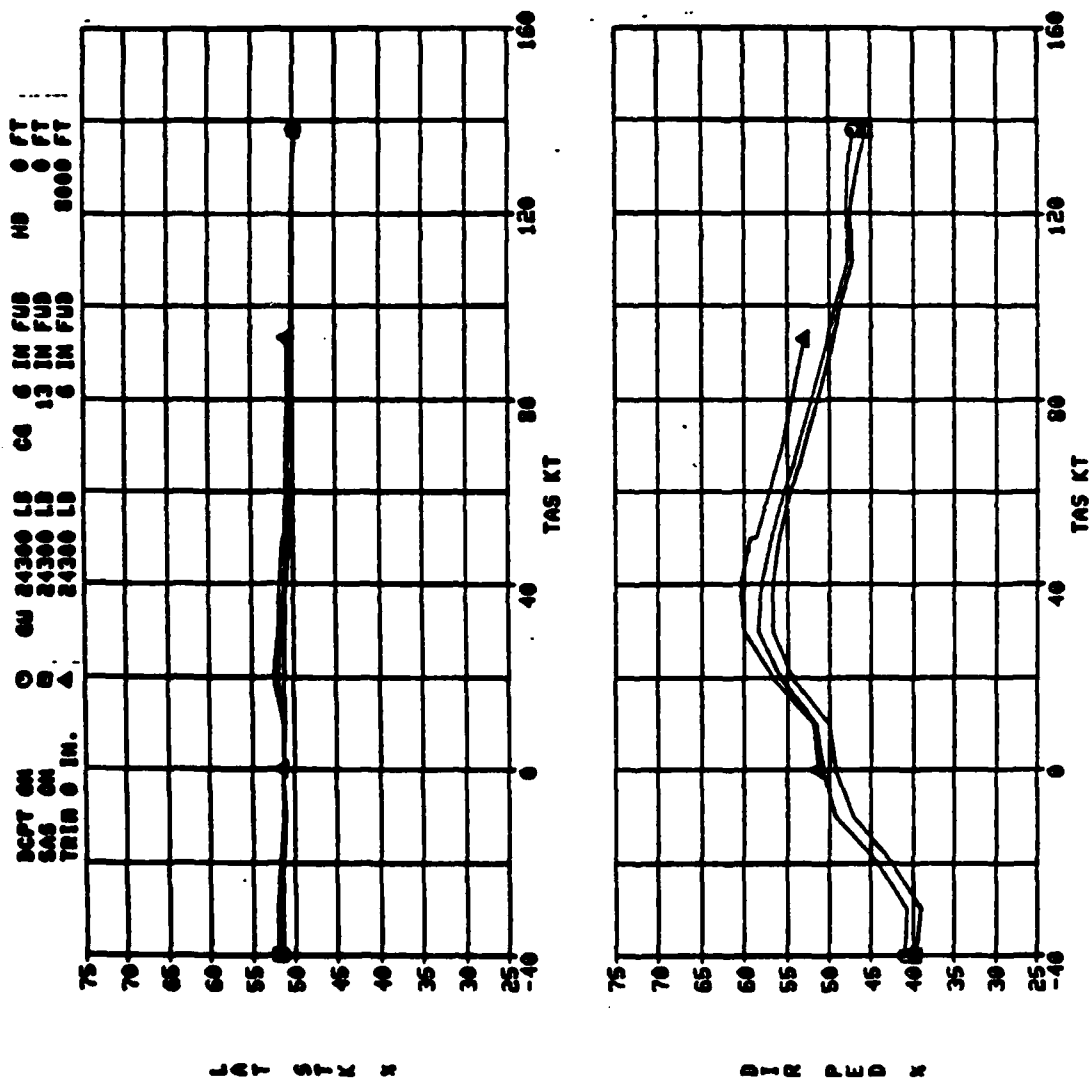


FIGURE 1B

CH-46E TRIM CHARACTERISTICS LEVEL FLIGHT

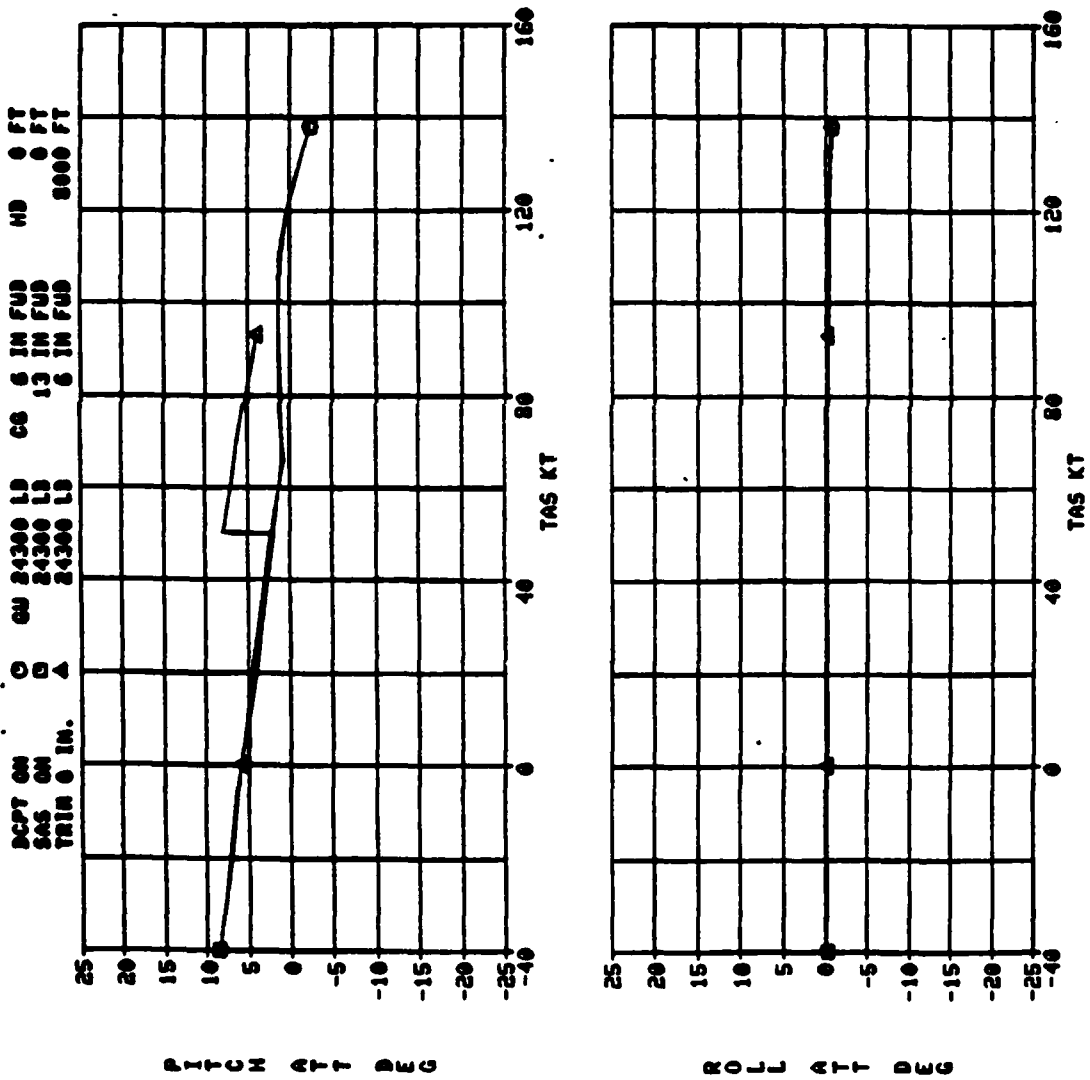


FIGURE 1C

CH-46E TRIM CHARACTERISTICS
LEVEL FLIGHT

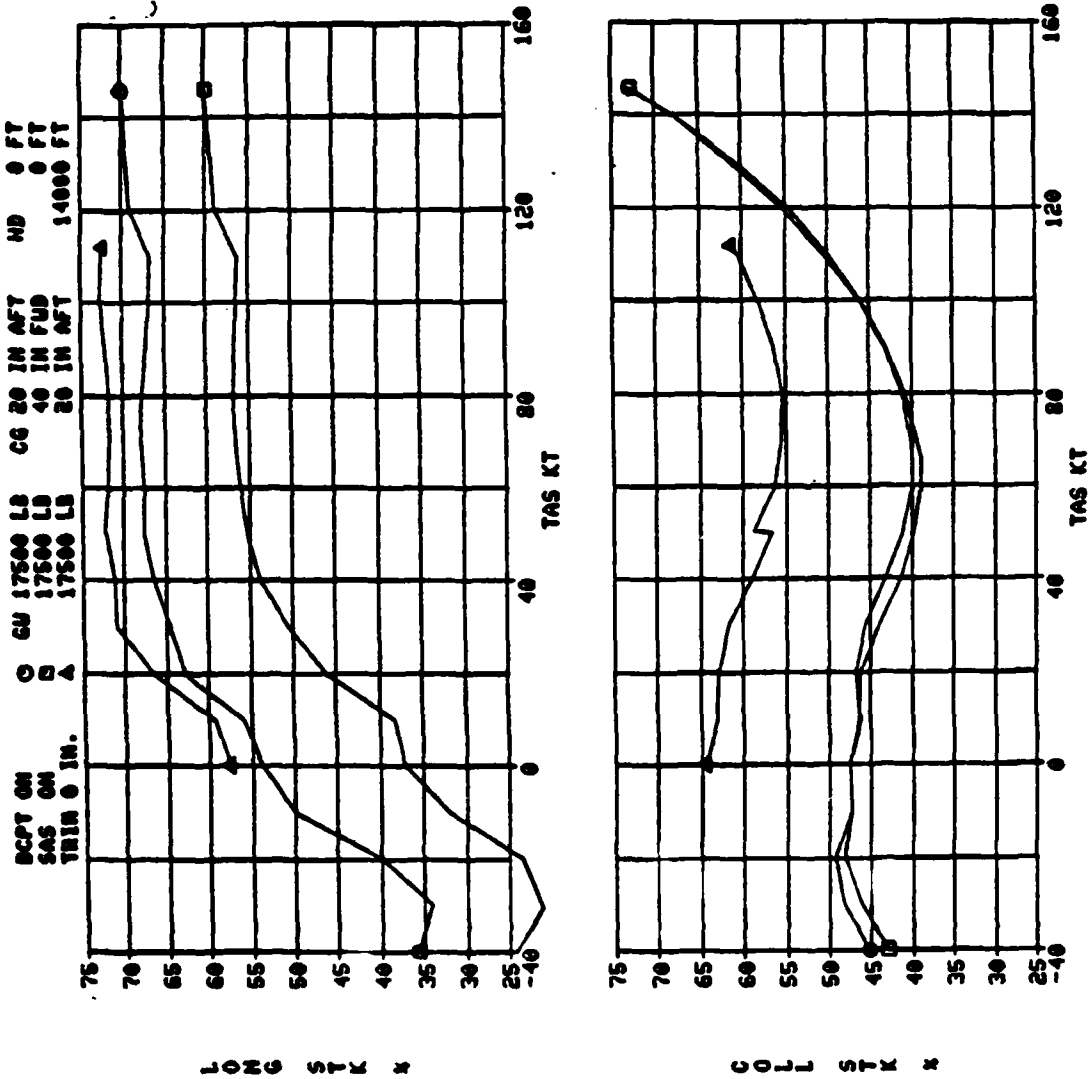


FIGURE 2A

CH-46E TRIM CHARACTERISTICS
LEVEL FLIGHT

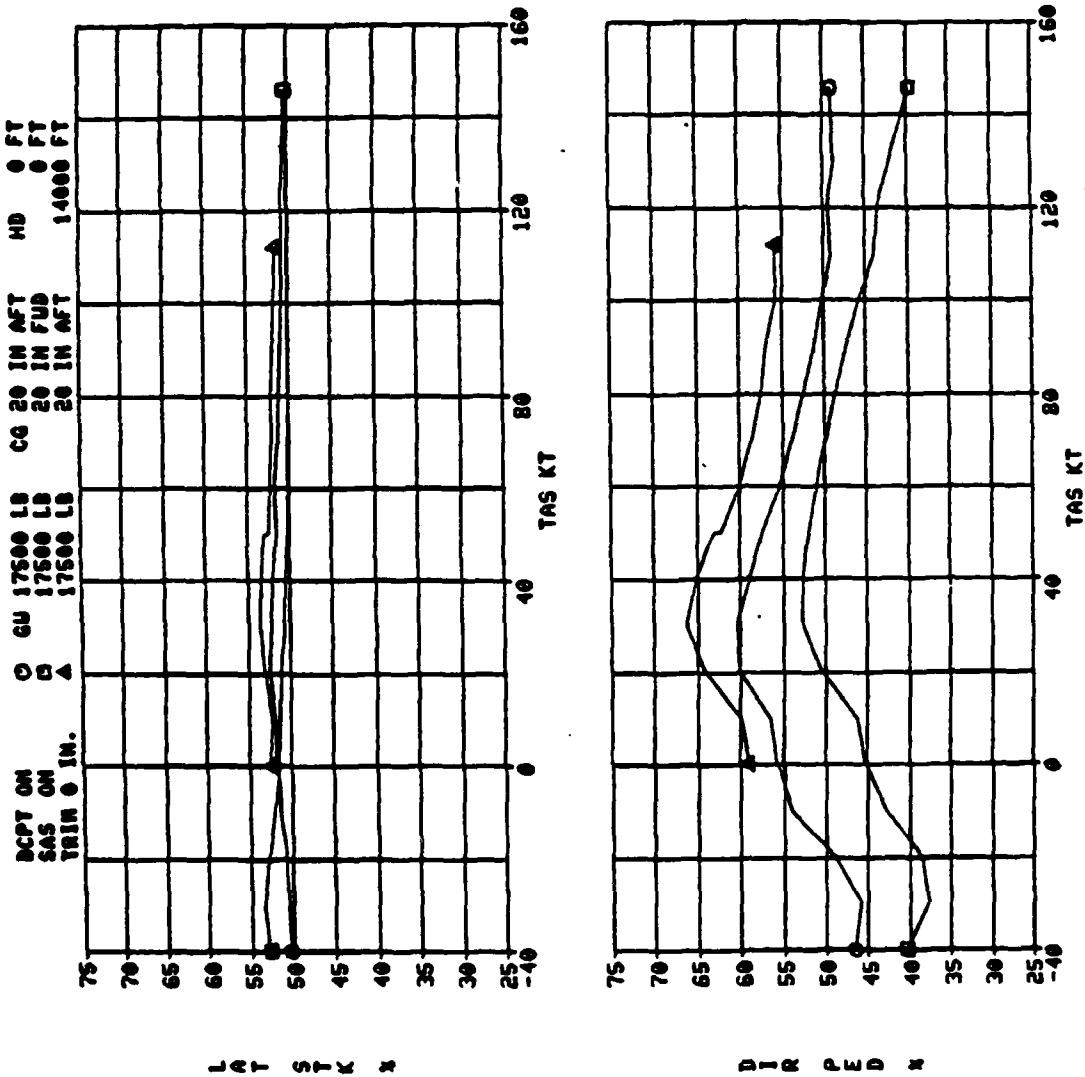


FIGURE 2B

CH-46E TRIM CHARACTERISTICS
LEVEL FLIGHT

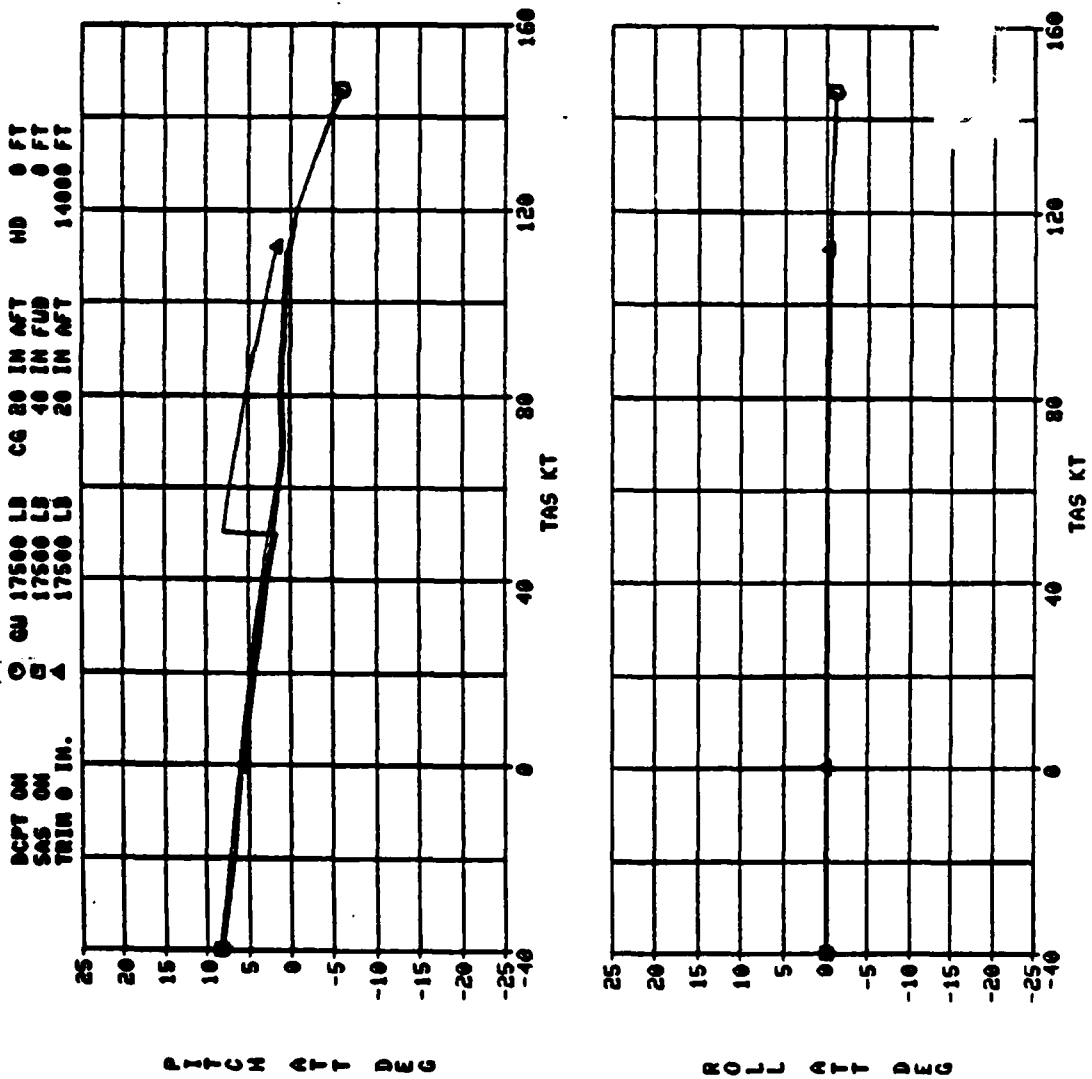
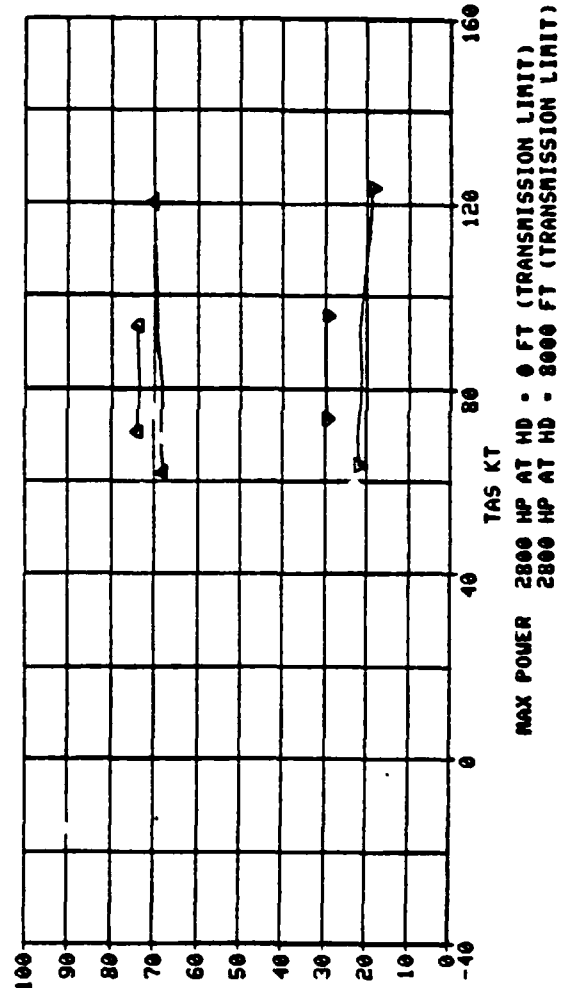
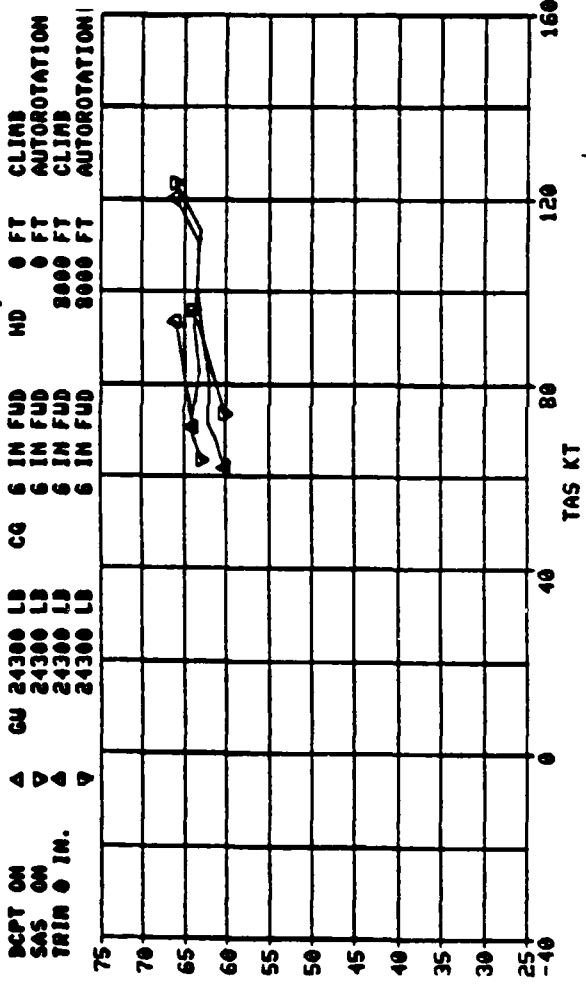


FIGURE 2C

**CH-46E TRIM CHARACTERISTICS
MAX POWER CLIMB & AUTOROTATION**



LONG SFX

COLL SFX

FIGURE 3A

**CH-46E TRIM CHARACTERISTICS
MAX POWER CLIMB & AUTOROTATION**

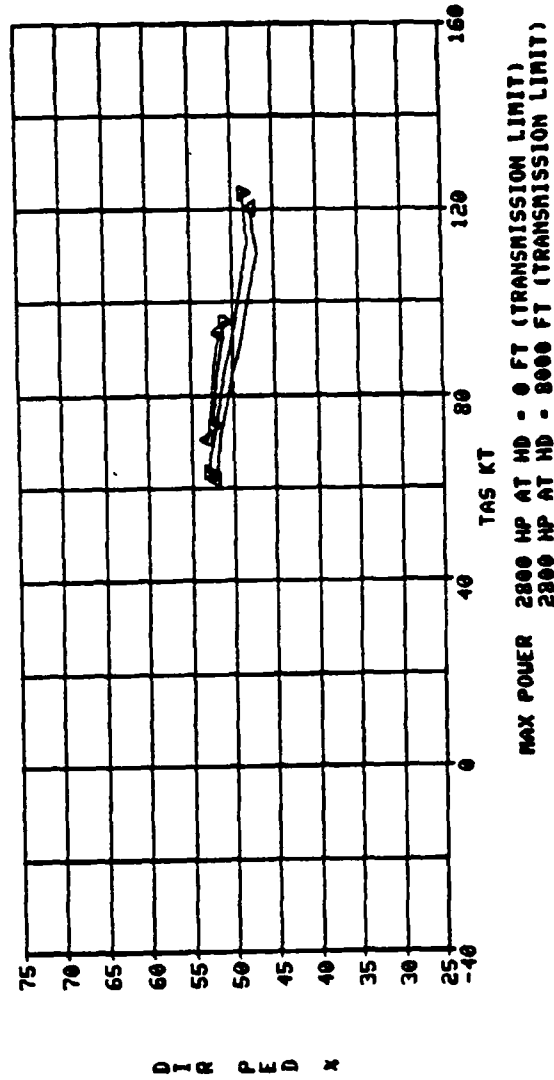
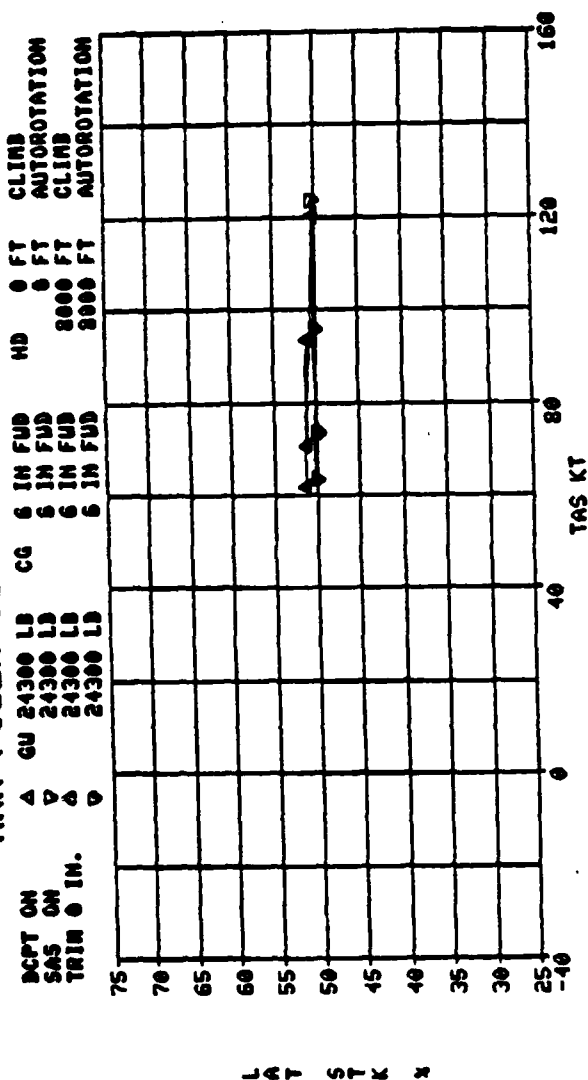


FIGURE 3B

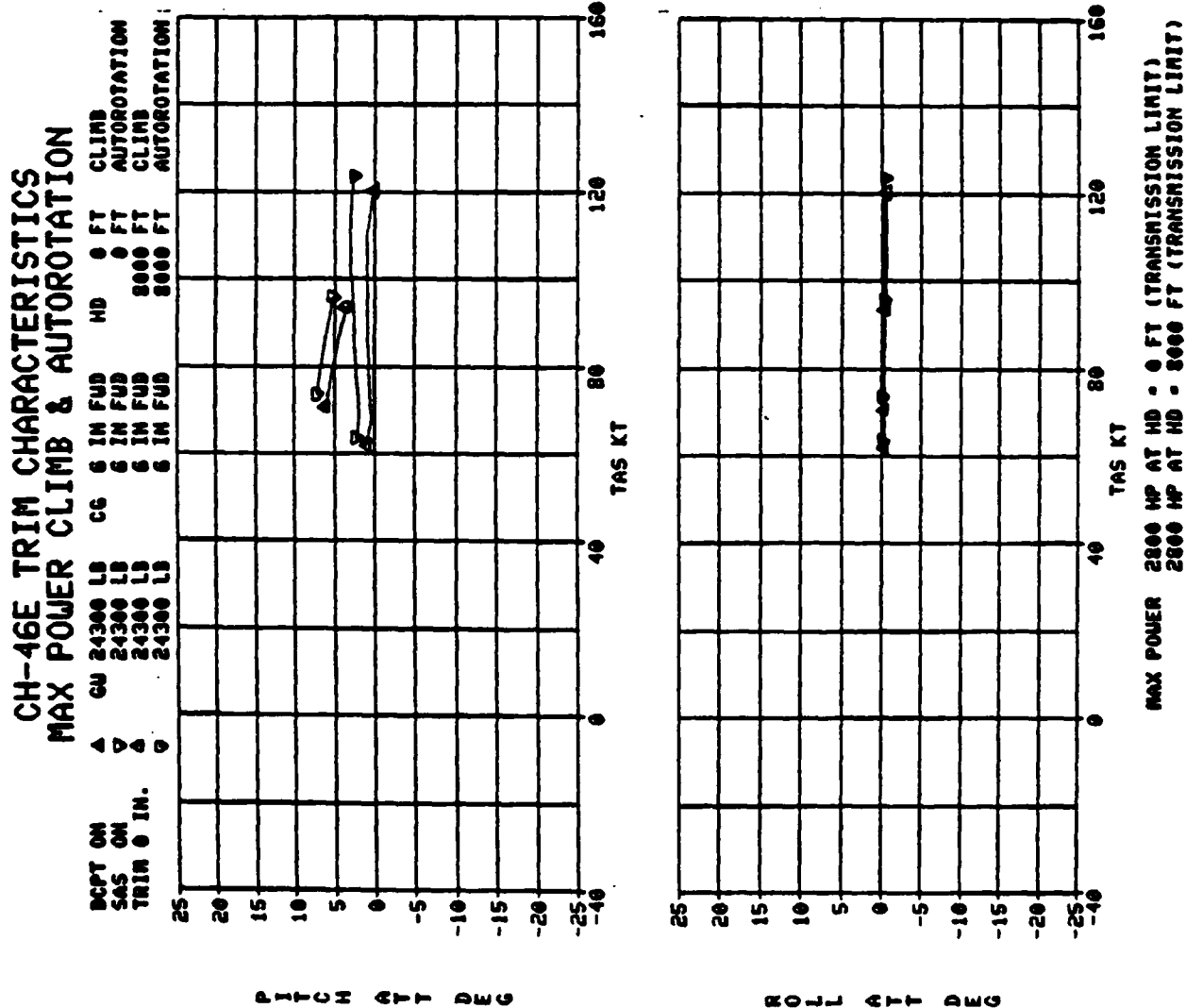
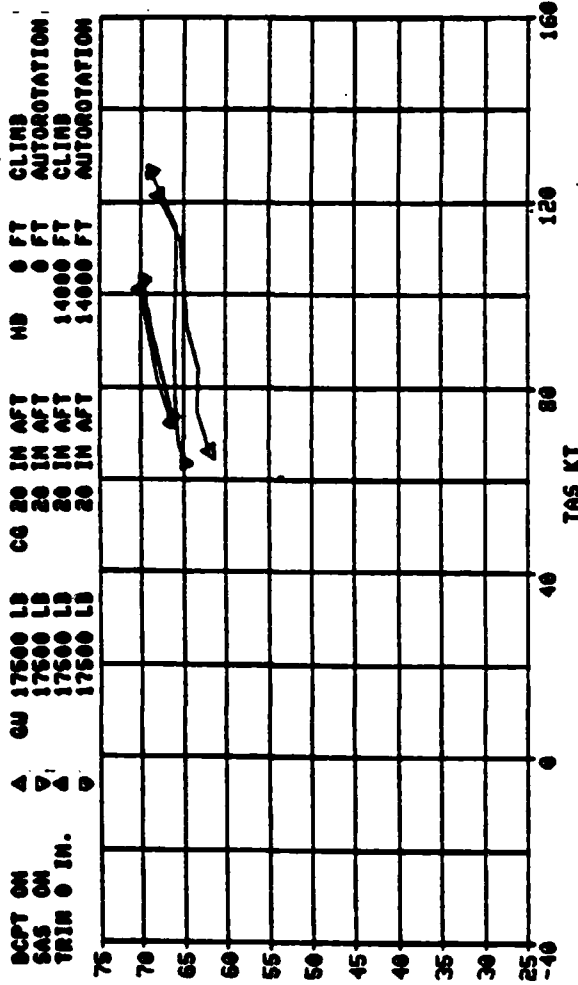
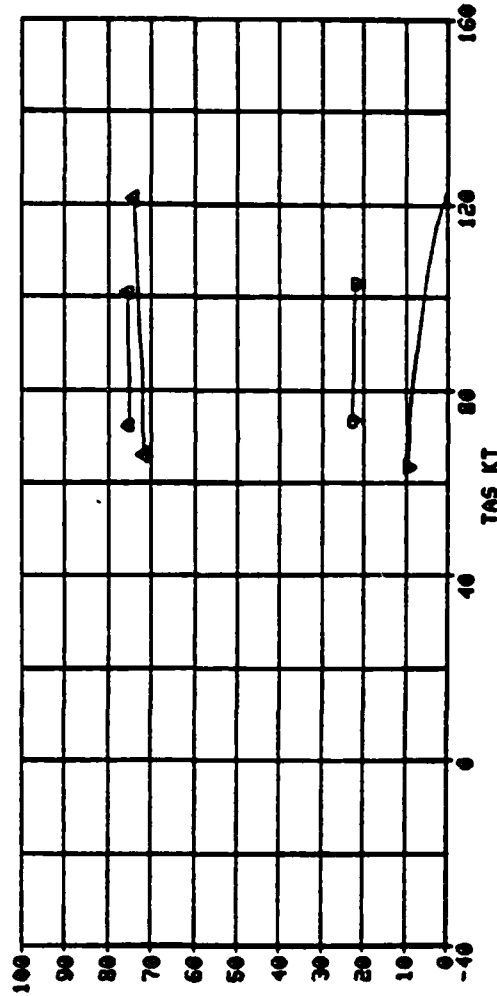


FIGURE 3C

**CH-46E TRIM CHARACTERISTICS
MAX POWER CLIMB & AUTOROTATION**



LONG STRAKE

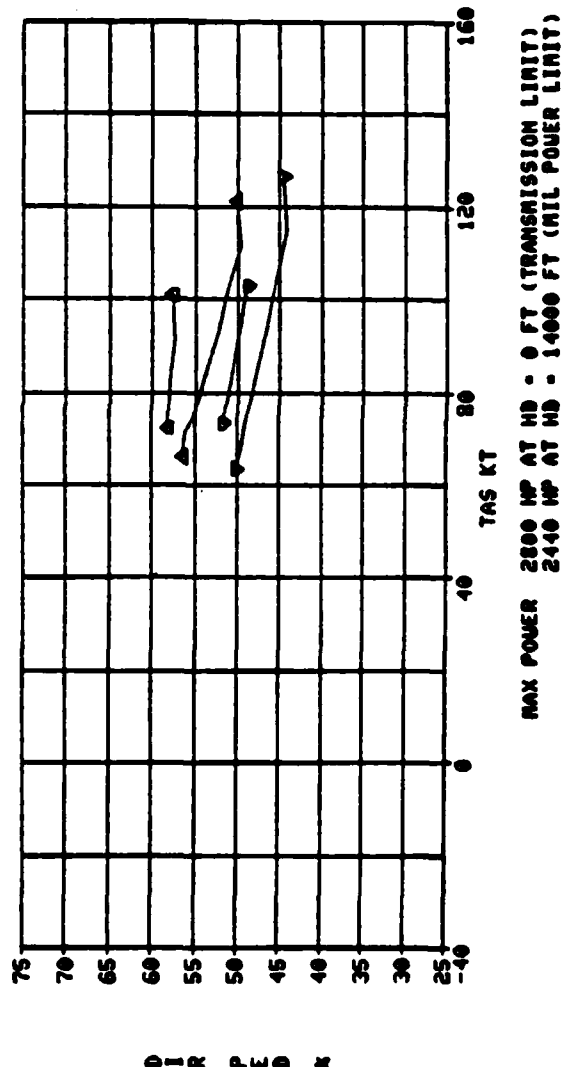
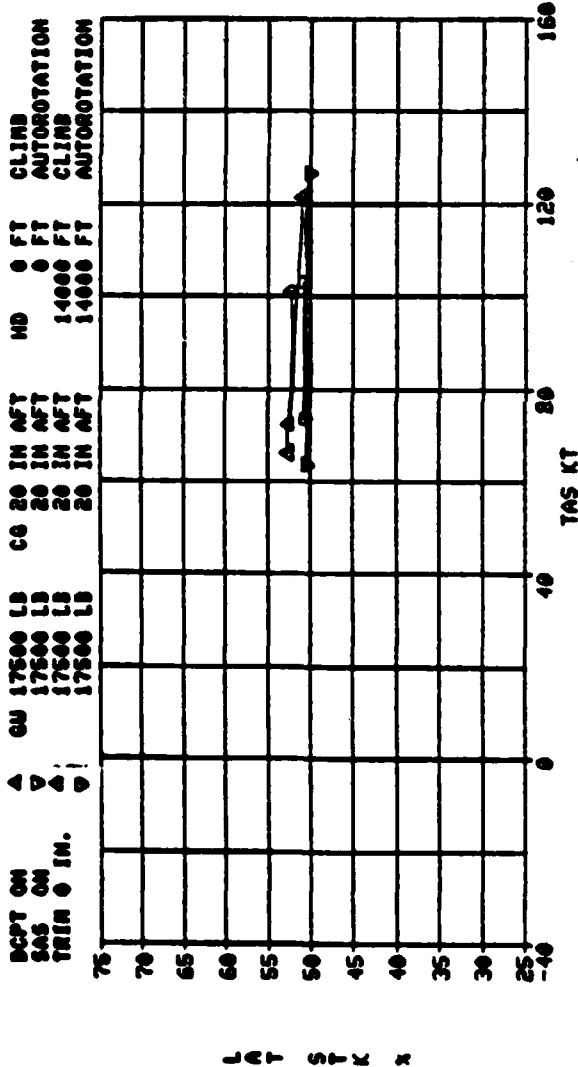


COLL STRAKE

MAX POWER 2800 HP AT HD - 0 FT (TRANSMISSION LIMIT)
2440 HP AT HD - 14000 FT (MIL POWER LIMIT)

FIGURE 4A

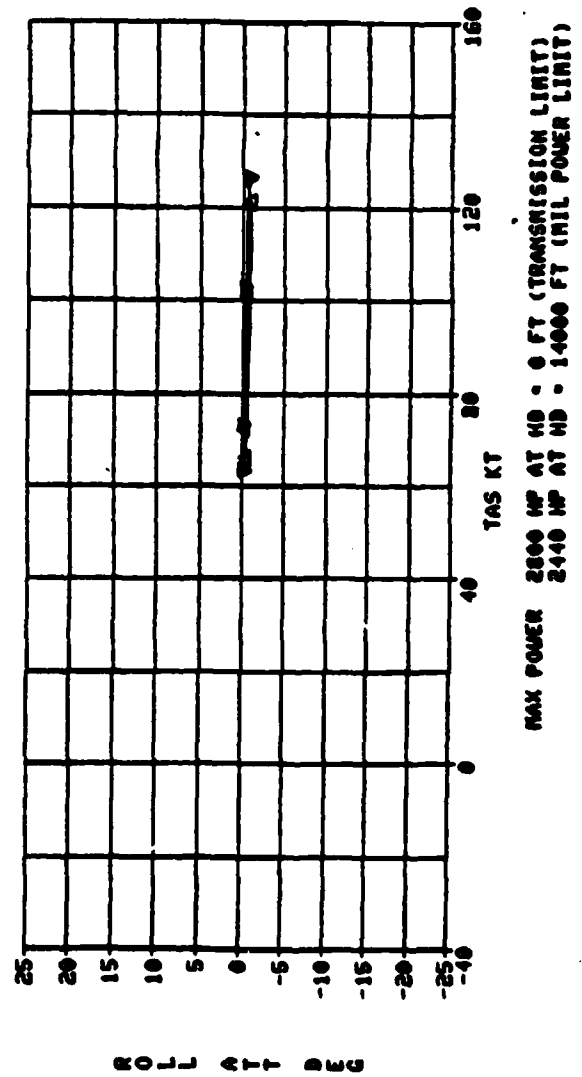
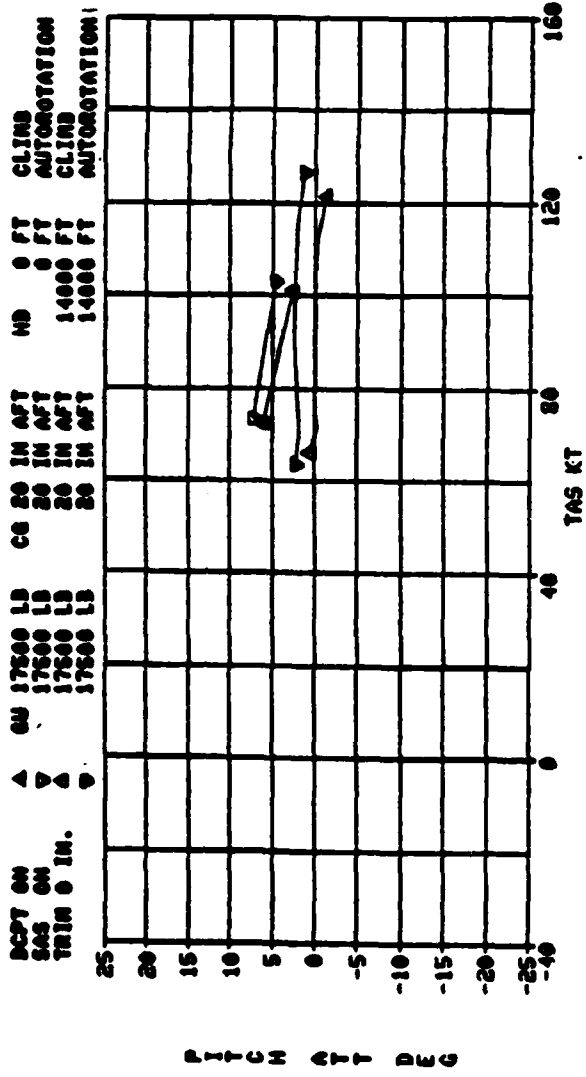
**CH-46E TRIM CHARACTERISTICS
MAX POWER CLIMB & AUTOROTATION**



MAX POWER 2800 HP AT HD - 0 FT (TRANSMISSION LIMIT)
2400 HP AT HD - 14000 FT (MIL POWER LIMIT)

FIGURE 48

**CH-46E TRIM CHARACTERISTICS
MAX POWER CLIMB & AUTOROTATION**



MAX POWER 2800 HP AT HD - 0 FT (TRANSMISSION LIMIT)
2400 HP AT HD - 14000 FT (MIL POWER LIMIT)

FIGURE 4C

CH-46E TRIM CHARACTERISTICS
SIDESLIP

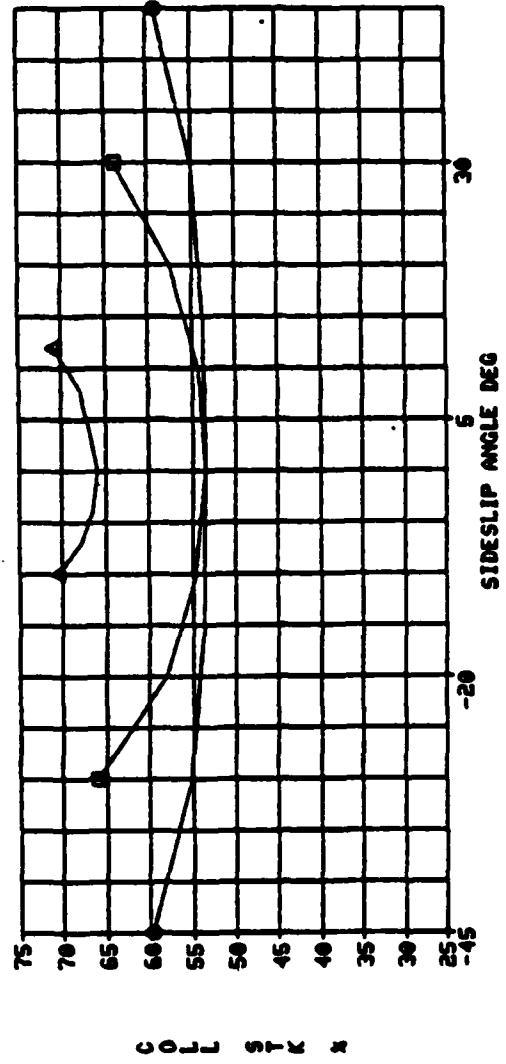
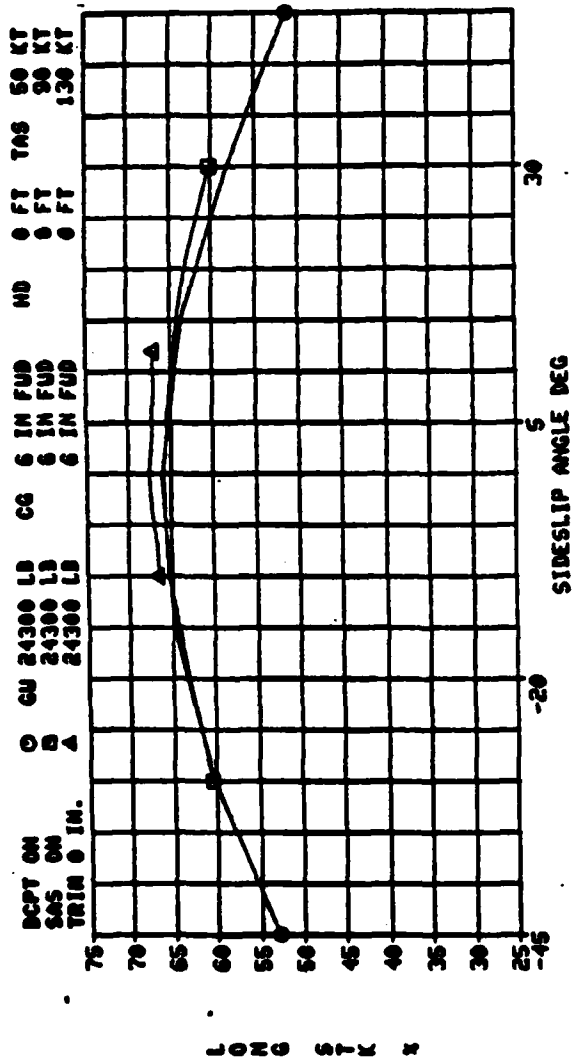


FIGURE 5A

CH-46E TRIM CHARACTERISTICS
SIDESLIP

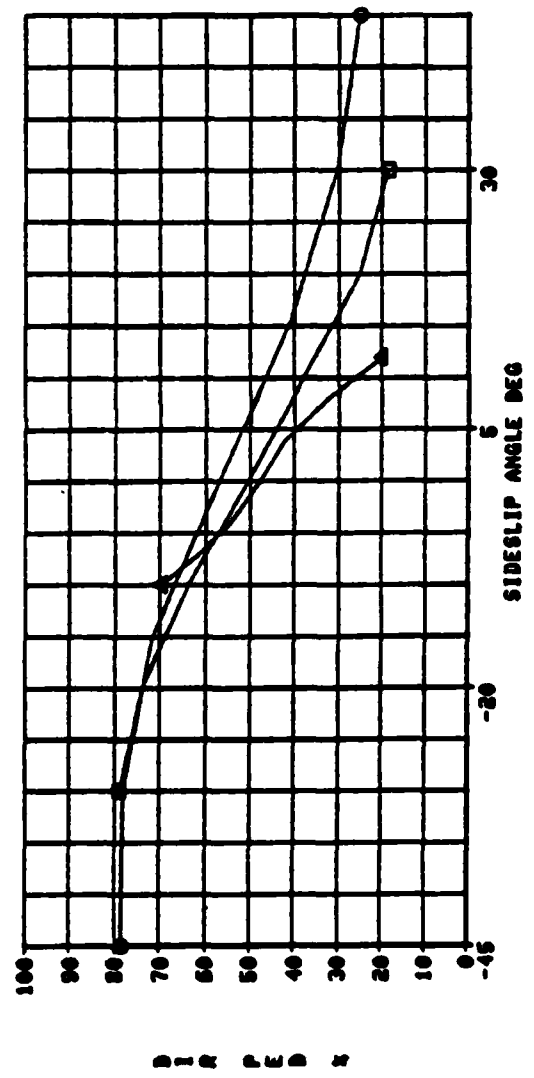
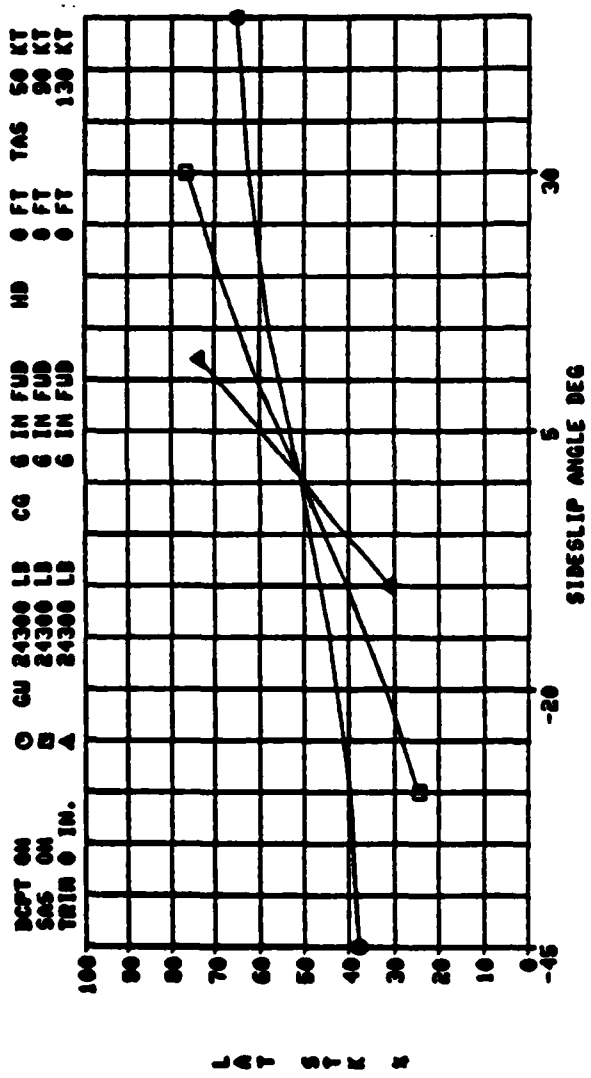


FIGURE 5B

CH-46E TRIM CHARACTERISTICS
SIDESLIP

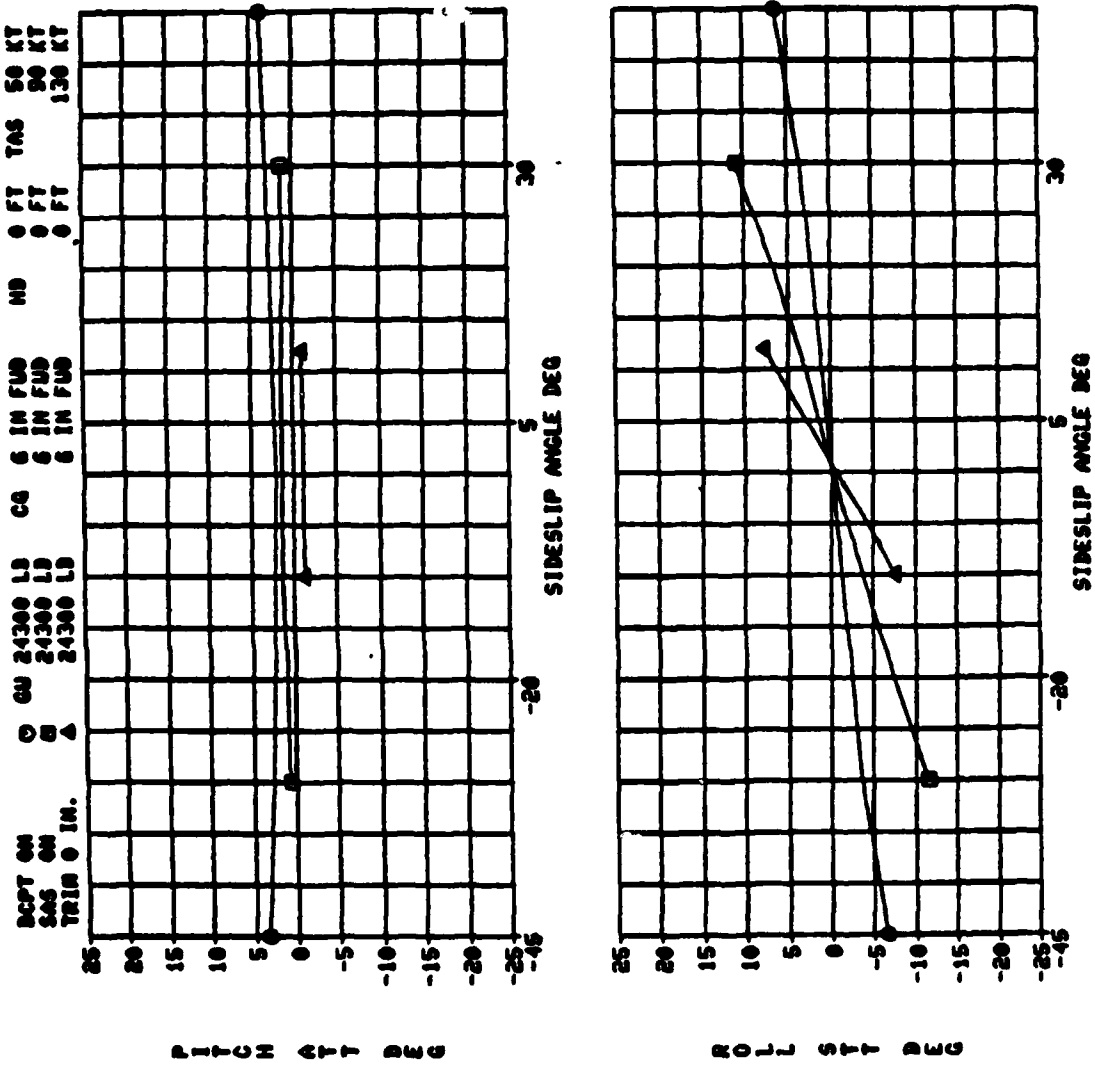


FIGURE 5C

CH-46E TRIM CHARACTERISTICS
SIDESLIP

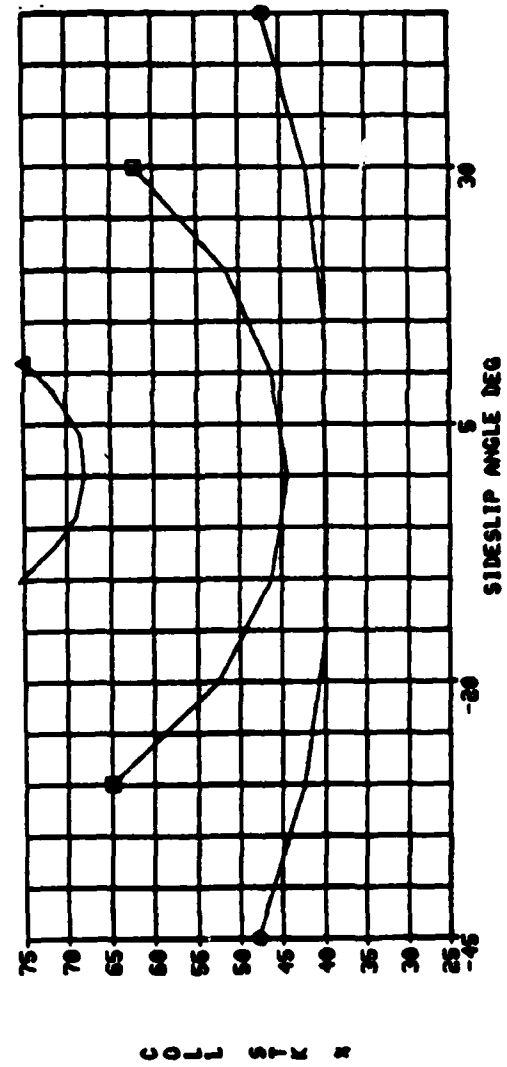
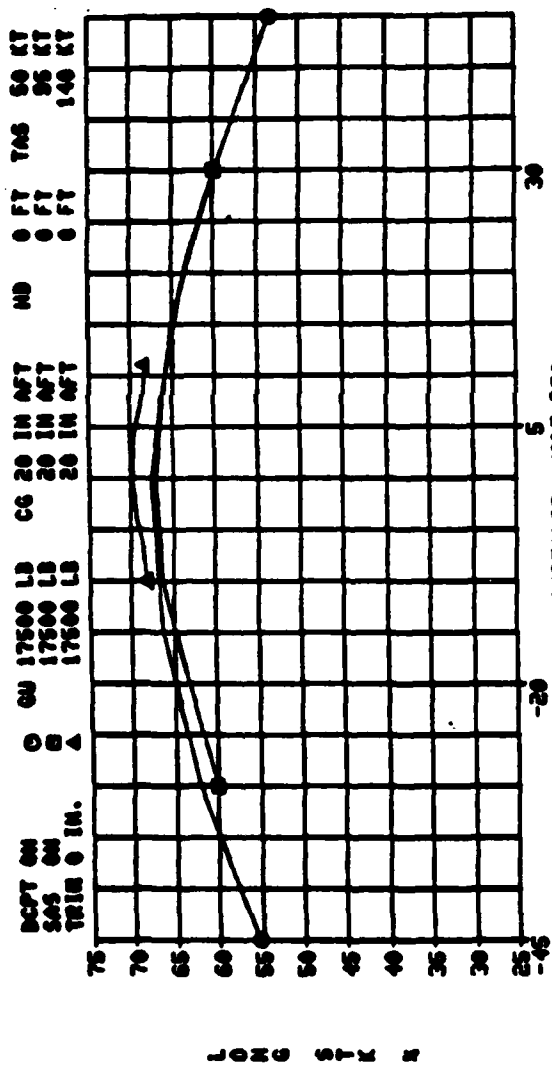
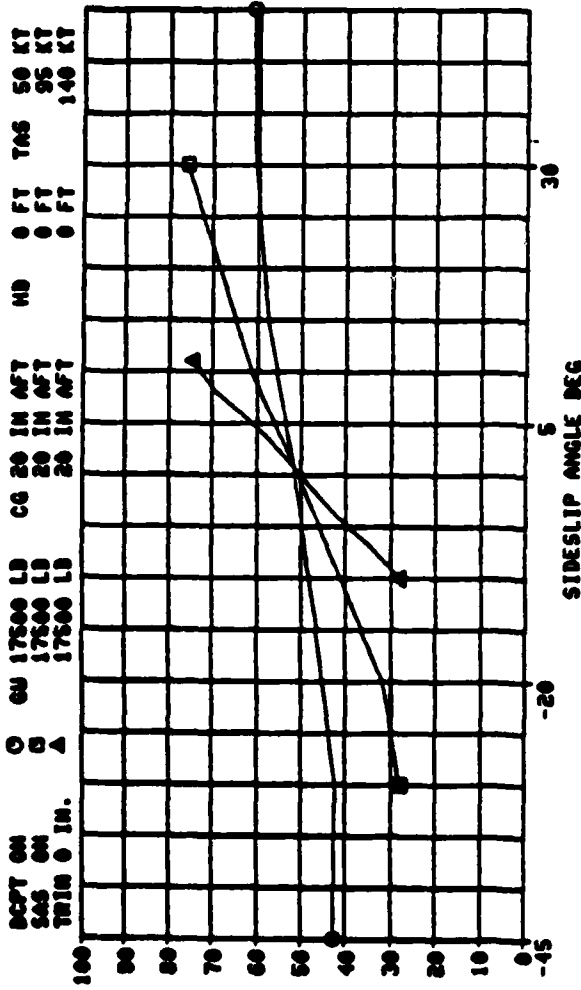
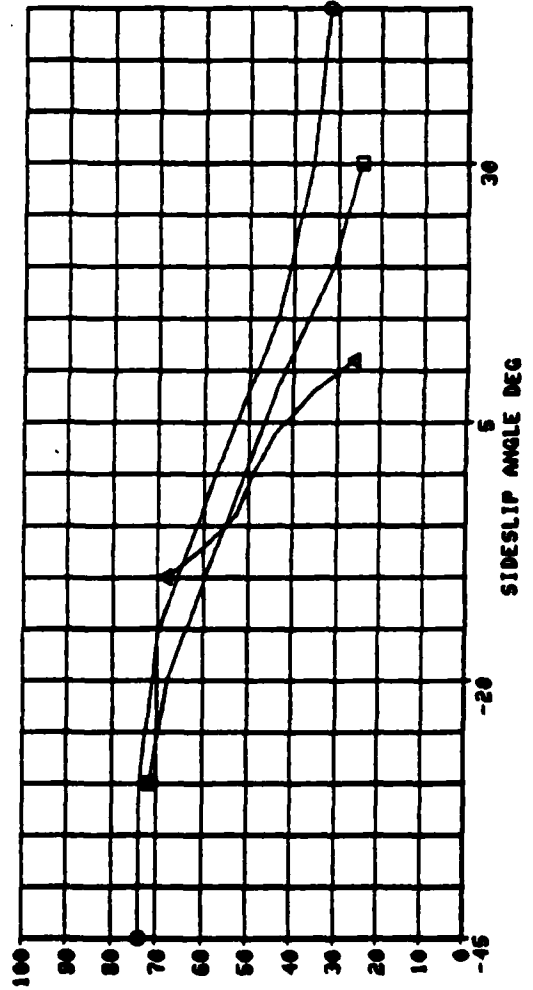


FIGURE 6A

CH-46E TRIM CHARACTERISTICS
SIDESLIP



L A T E R A L



P I T C H

FIGURE 6B

CH-46E TRIM CHARACTERISTICS
SIDESLIP

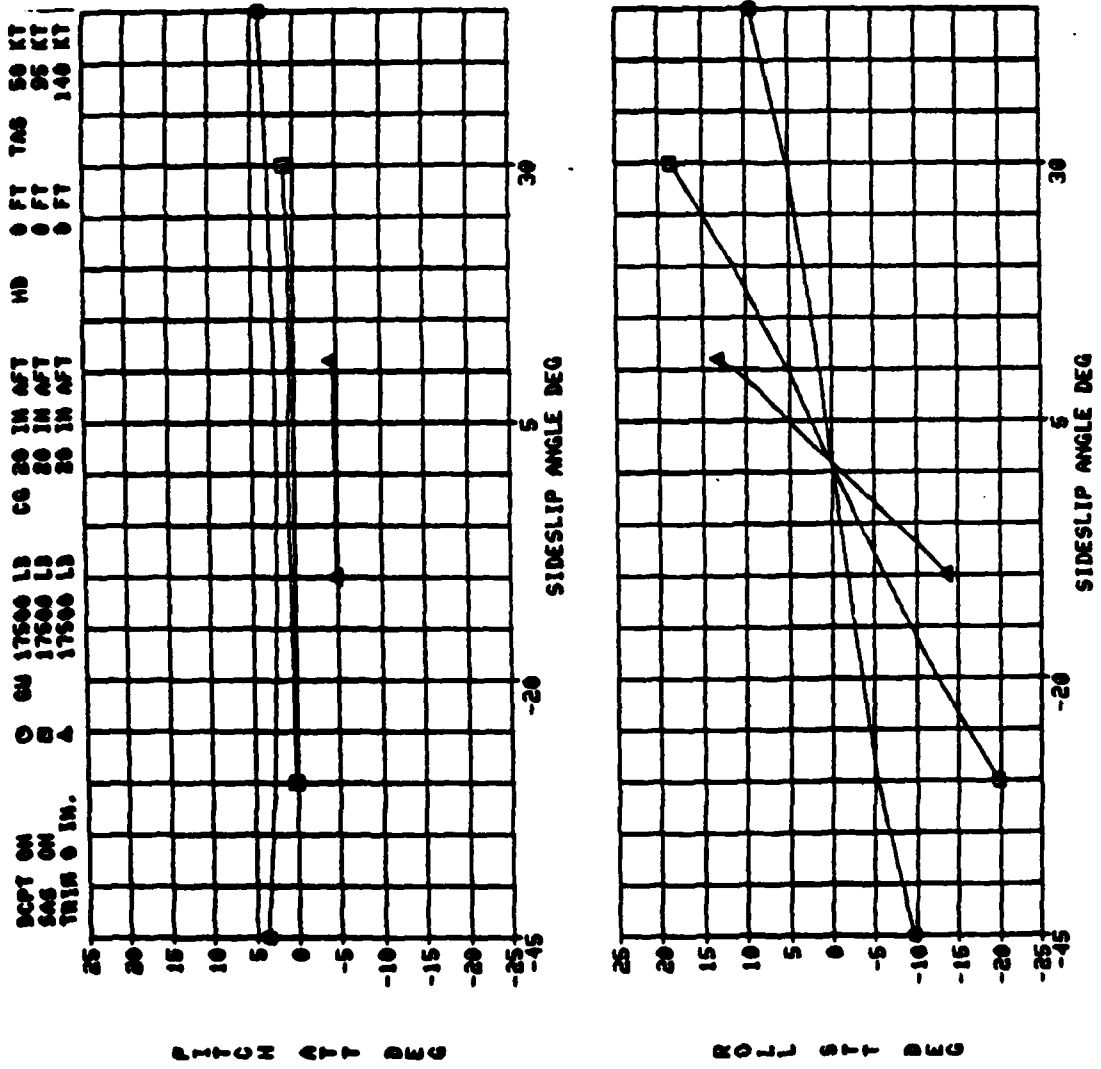
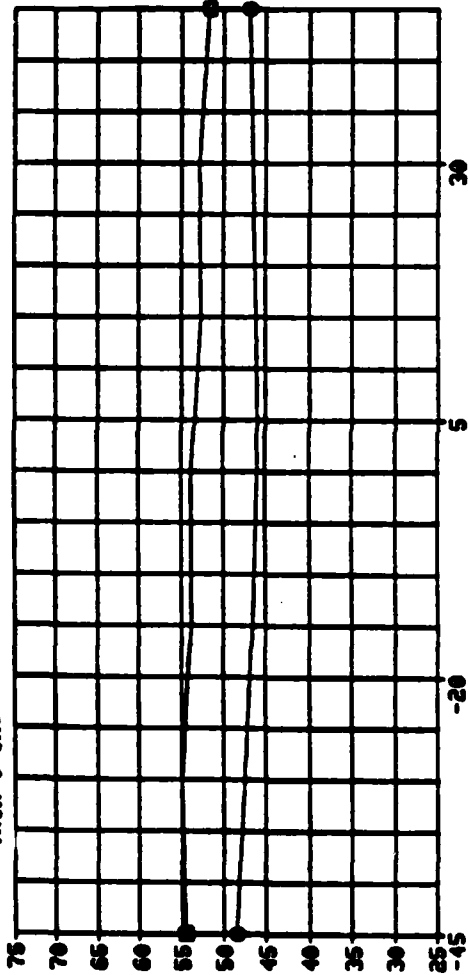


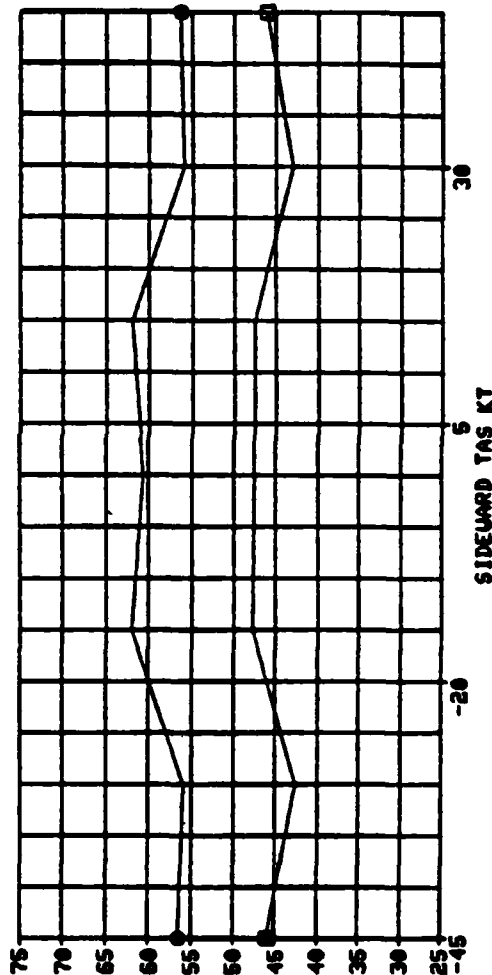
FIGURE 6C

CH-46E TRIM CHARACTERISTICS
SIDEWARD FLIGHT

DCPT ON O CW 24300 LB CG 6 IN FWD HD 0 FT
 SAS ON O 17500 LB 20 IN AFT 0 FT
 TRIM 0 IN.



LONG STK X



COLL STK X

FIGURE 7A

CH-46E TRIM CHARACTERISTICS
SIDEWARD FLIGHT

DCPT ON □ GU 24300 LB CG 6 IN FWD HD 0 FT
SAS ON □ 17500 LB CG 20 IN AFT 0 FT
TRIM 0 IN.

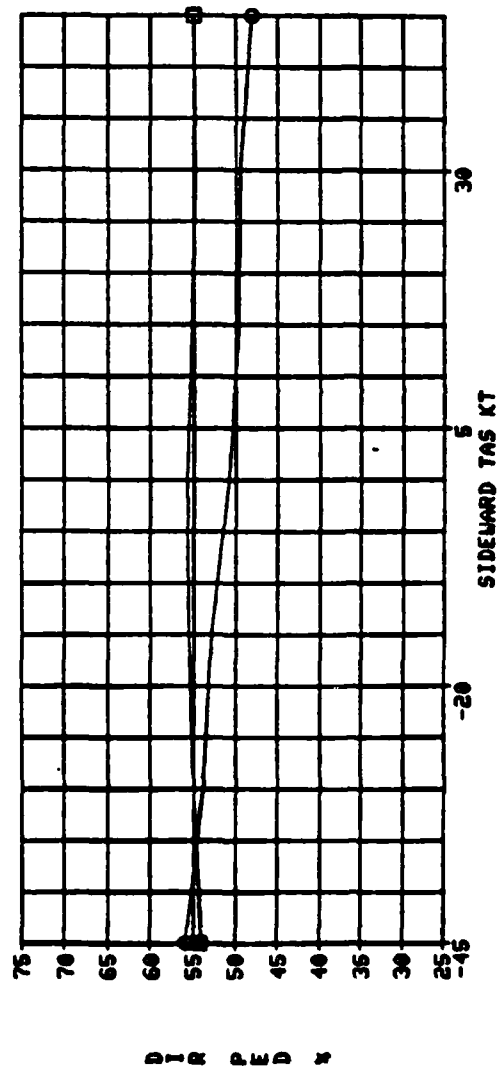
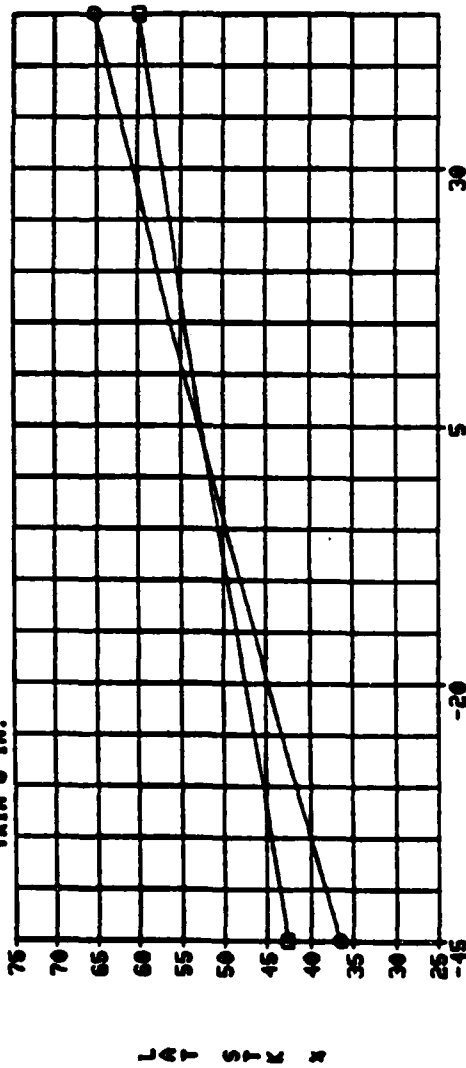


FIGURE 7B

**CH-46E TRIM CHARACTERISTICS
SIDEWARD FLIGHT**

DCPT ON ○ GU 24300 LB CO 6 IN FWD MD ○ FT
 SAS ON □ 17500 LB CO 20 IN AFT MD ○ FT
 TRIM ○ IN.

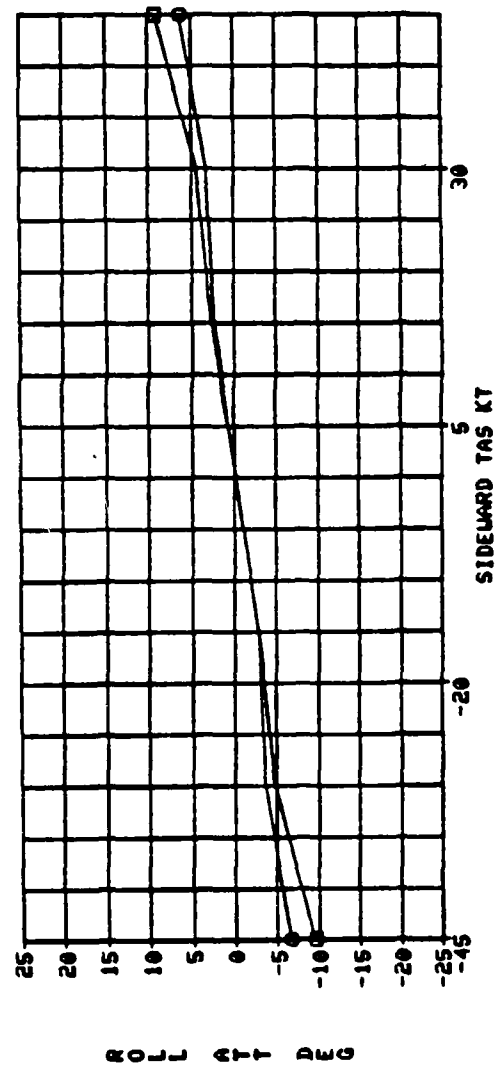
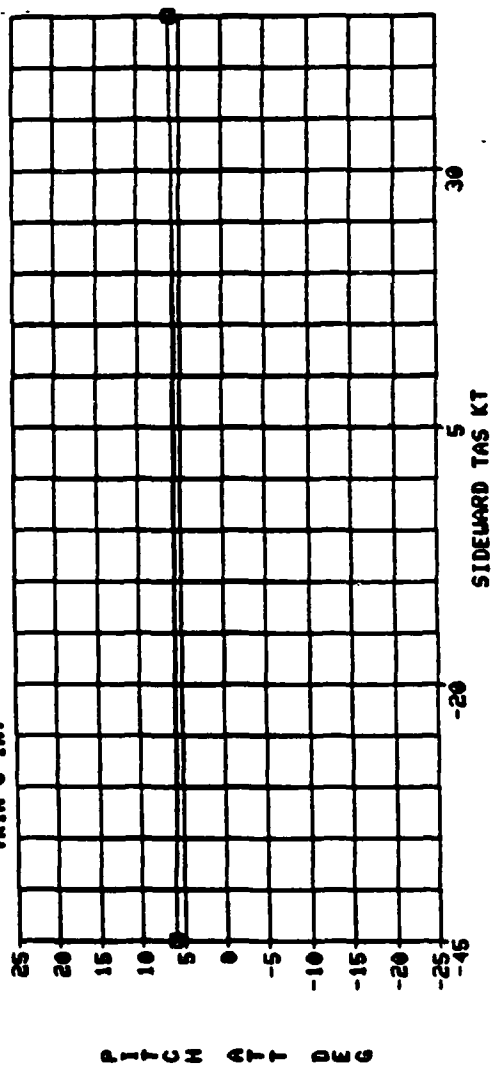


FIGURE 7C

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