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Monterey, California. Naval Postgraduate School

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## NAVAL POSTGRADUATE SCHOOL Monterey, California



## THESIS

DETERMINATION OF QUANTITATIVE RELATIONSHIPS BETWEEN SELECTED CRITICAL HELICOPTER DESIGN PARAMETERS

by

Ronald S. Petricka

September 1984

Thesis Advisor:

D. M. Layton

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	REPORT DOCUMENTATION	PAGE	BEFORE COMPLETING FORM
1. 8	EPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4 [ [	Determination of Quantitativ Relationships Between Select Critical Helicopter Design E	/e ied Parameters	<ul> <li>S. TYPE OF REPORT &amp; PERIOD COVERED Master's Thesis September 1984</li> <li>6. PERFORMING ORG. REPORT NUMBER</li> </ul>
			A CONTRACT OR GRANT NUMBER(A)
Ē	Ronald S. Petricka		
9. F	PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
1 1	Naval Postgraduate School Monterey, CA 93943		
1.	CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE
1 1	Naval Postgraduate School Monterey, CA 93943		September 1984
14.	MONITORING AGENCY NAME & ADDRESS(11 dillerent	from Controlling Office)	353 15. SECURITY CLASS. (of this report)
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6.	DISTRIBUTION STATEMENT (of this Report)		
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S-N 0102- LF- 014- 6601

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Approved for public release; distribution unlimited.

Determination of Quantitative Relationships Between Selected Critical Helicopter Design Parameters

by

Ronald S. Petricka Captain, United States Army B.S., United States Military Academy, 1973

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL September 1984



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This thesis determines the relationships of Helicopter design parameters by first depicting graphically all possible pairings of selected design parameter values and then, secondly, depicting graphically respective curve fits for the data point plcts which meet an acceptance criteria. In generating the curve plots, the specific constants of each curve equation are determined, thus allowing the designer the ability to derive quantitatively the values of many of the design parameters heretofore selected by trial and error methods.

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Definite relationships between these critical design parameters (30 have been selected), are frequently unavailable, or unknown, and are not used during the preliminary design process. By examining all possible pairings, or permutations, across a large number of present helicopter designs (10 have been chosen), one could produce equations of curves which would consistently, accurately and quickly produce the quantitative value for the design parameter a designer seeks.

#### A. OEJECTIVES AND SCCPE

The cljective of this thesis is to determine if quantitative relationships exist between the pairings of critical helicopter design parameters. If they do exist, specific

equations of curves, forming a curve fit of the lata, and specific constants, are to be determined.

.

#### II. AFPROACH TO THE PROBLEM

Thirty design parameters were selected and a data base was compiled of the values of these design parameters for 10 helicopters. The 10 helicopters chosen were selected purposely to represent a varied mix of single-mission aircraft (utility, heavy utility, scout or observation, and attack), and old and new technology, ranging from the 1950's to the late 1970's, to lend creditability to the resulting relationships for use in any future preliminary melicopter design process. Selected design parameters, and the respective values for each of the chosen helicopters are listed in Appendix A. A planform and abstract picture of each helicopter, for referencing, is contained in the same Appendix. Table 1 is a brief summary which illustrates the diversity of the helicopters chosen to compile the data base for this thesis.

Pairing each parameter singularly against each other yielded 435 permutations at the start of the evaluation. The pairings are referenced by 2 numbers. For example, the pairing number '1-30' pairs the first design parameter, Main Rotor Elade Radius, against the thirtieth design parameter, Maximum Gross Weight. Appendix B contains a complete listing of pairings. A simple data point graph (X vs. Y) was made of each pairing and, for the graphs that showed a clear relationship existed, data points are curve fitted yielding a curve equation with specific constants. Both the singular data points, and the curves, generated from the curve equations, are depicted graphically, reinforcing the closeness of the curve fits, and that a relationship does indeed exist.

#### TABLE 1

Summary	Charac	teristics	of Chosen	Helicop	ters
---------	--------	-----------	-----------	---------	------

Military	Weignt	Primary	Year of	Year of	Mission
Designator	Class	Service 1	Manufacture	Technology	Purpose
AH64 OH58C SH-3H S-76 UH-60A CH-54B CH-53D CH-53E AH-1S UH-1H	Medium Light Medium Medium Heavy Heavy Heavy Medium Medium	USA USA USN USA USN (MC) USA USA USA	1983 1969-78 1961-72 1982 1979 1974 1969 1981 1970-81 1965-76	1970 1960 0 1950 1970 1970 1960 1960 1960 1950	Attack bservation Utility Utility Utility Utility Utility Utility Attack Utility

In addition to original programs, two pre-existing computer programs were used to facilitate the accomplishment of the thesis objective. The data point plots were generated with 'Helicopter Data Display', written by Captain Gary Eishop, USA, [Ref 1], and the curve fit evaluation was accomplished with 'Crvfit', a Hewlett-Packard hand-held computer program, written by Commander Pat Sullivan, USN, [Ref 2]. The 'Helicopter Data Display' graphic output was re-sized to meet the requirements for thesis submission, and the pre-existing data base revised with additions of data from 3 more helicopters, a deletion of 1, and correction of some incorrect data. The 'Crvfit' program was used as is, with an acceptance criteria, called the correlation factor, cf .8 cr greater.

#### III. SOLUTION TO THE PROBLEM

Of the first 435 pairings, 153 were cut from consideration following an initial consultation with Thesis Advisor Frof. Donald Layton based on his own expertise. Those pairings disregarded from further evaluation are indicated by a prefixed "XX" in Appendix B. An example of pairings which were disregarded outright were those involving 'Degree Twist of Blades'. By experience, and verified thru conversations with helicopter company representatives, 'Twist of the Elade' has in the past been decided on by a 'what's on the shelf' selection criteria, thus explaining why some companies produce helicopters predominantly with a -10 degree twist, while others produce helicopters predominantly with a -8 degree twist, or, a 0 degree twist. 282 simple X-Y plcts cf the remaining pairings were then generated, with the first number of each pairing designated as the X-abcissa, or horizontal axis, and the second number, as the Y-ordinate, cr vertical axis. Plcts appear in Appendix C and are referenced with figure numbers consistent with the method used to reference the initial pairings (Example: Fig 1-30). The selection for further evaluation for determining curve fits was accomplished by empirically judging whether the data points tended to show that a relationship existed. Incse figures referenced with a suffix 'a' indicate that a relationship does exist and a data point curve fit follows. The two examples are illustrated in Figures 3.1 and 3.2.

The data of the data points plots that were questionable were submitted to the Crvfit program which made the final decision as to whether there was an interrelationship with a resulting program correlation factor of .8 or greater.



Figure 3.1 Data Fcint Plot Chosen to be Curve Fitted.



Figure 3.2 Data Point Plot Chosen Not to be Curve Fitted.

At the same time, the 'Crvfit' program determined which of 4 (four) curve types, linear (Type 1), exponential (Type 2), logarithmic (Type 3), or power (Type 4), best fit the data points plotted. An example of one of each of the 4 curves is illustrated in Figures 3.3 through 3.6. Curve fits for the respective pairings, referenced with a suffix 'b', indicating curve fit (Example: Fig 1-30b), and which includes the best curve fit equation, follow their respective data point plots in Appendix C.



Figure 3.3 Example of Type 1 Curve Fit.



Figure 3.4 Example of Type 2 Curve Fit.



Figure 3.5 Example of Type 3 Curve Fit.



Figure 3.6 Example of Type 4 Curve Fit.

#### IV. RESULTS AND CONCLUSIONS

282 rairings were evaluated to determine whether an interrelationship existed between the selected design param-185 were determined to produce positive curve fit eters. data which met or exceeded the chosen correlation factor. Of the 30 design parameters selected for evaluation, the parameters Maximum Grcss Weight and Operating Weight were most interactive, resulting in positive quantitative relationships with 16 other parameters. This is understandable for both parameters are geometric parameters, driven by mission and performance requirements and both influence many 10 design parameters had no influence, of the cthers. resulting in no relationship with any other parameter. A demonstration of the validity of the derived relationships is illustrated as follows where both the curve fit equation, and an alternate method (used in AE 4306 Helicopter Design Manual [Ref 3]), are used to generate specific design parameters of Gross Weight and Tail Rotor Radius. The results are compared to an existing, flying helicopter.

Required: Compute Gross Weight, MGW, as a function of Tail Rotor Radius, RTR, given as 2.6 feet. Curve Fit - MGW = 324.88 x RTR 2.3829 = 3166 lbs Equation AF 4306 - MGW = 591.716 x RTR 2.0 = 4000 lbs Design Manual (Alternate Method) 2.6 feet is the actual tail rotor radius of the OH58C Army Cbservation/Scout Helicopter whose actual Gross Weight is 2550 lbs. By comparison, the curve fit equation generates a value of Gross Weight 24% above actual design, whereas the alternate method cenerates a value 52% above actual design. Table 2 lists the number of relationsnips, or the influence cf each design parameter upon each other.

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	2	K	×	×	T	×	F	×	Т	×	F	F	Γ	T	Г	T		T	×	м	Γ	Γ	T	T	T	Γ	×	×	F	T	
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		Main Estor Radius (ft)	Tall Actor Radius (it)	Number of Main Rotor Blades	Number of Tail Botcr Blades	Height of Main Rotor aloge Trourd (fil	Speed of Main Rotor System	Spéed of Tail Rotor System	Chord of Main Rotor (ft)	Cuord of Tall Rotor (ft)	Span of Main Botor Blade (ft)	Span of Tail Rotor Blade (ft)	Tvist of Main Rotor Blade	Tvišt of Tail Kotor Blaje (dejrees)	Profile Drag of Main Rotor Alade	Profile Drag of Tail Kotor	Disc Loadiny of Main Rotor	Width of Fuselage (ft)	Length of Puselage (ft)	Frontal Horizontal Flat Flate Area (S5 ft).	FLODIAL VERTICAL FLAT	calleue tervard velocity	Hailaum Range (nu)	Rate of Climb (fpm)	Hover Celling (IGE)	Hover Ceiling (OGE)	Length of Tail (ft)	Operating Weignt (lb)	ioal feignt (1t)	Puel Weight (15)	Maximum Gross Reight (1b)
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TABLE 2

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### TABLE 2

#### A. CCNCIUSIONS

The chjective of this thesis has been achieved by establishing the clear relationships that exist between selected Helicopter design parameters. The curve fit equations that were derived, and the specific constants for each equation, provide the designer, be he professional, in the industry, or student, a means to quantitatively derive values of design parameters that are encountered during the preliminary design process.

Until technological breakthroughs force a drastic departure from the established design norms developed over the last 30 years, the curve fit equations can produce a quantitative, quicker, and more optimum solution than the methods employed to date.

#### <u>APPENDIX A</u>

REFERENCES FOR DATA BASE AND HELICOPTERS

A. SELECTED DESIGN FARAMETERS AND NOMENCLATURE

.

#### TABLE 3

Selected Design Parameters and Nomenclature

Selected Design Parameters	Nomenclature
<ol> <li>Main Rotor Radius (ft)</li> <li>Tail Rotor Radius (ft)</li> <li>Number of Main Rotor Blades</li> <li>Number of Tail Rotor Blades</li> <li>Height of Main Rotor System</li> </ol>	R R TR B B TR H T
<ul> <li>6. Speed of Main Rotor System (rrm)</li> <li>7. Speed of Tail Rotor System (rrm)</li> <li>8. Chord of the Main Rotor (ft)</li> <li>9. Chord of the Tail Rotor Blade (ft)</li> <li>10. Span of the Main Rotor Blade (ft)</li> <li>11. Span of the Tail Rotor Blade (ft)</li> <li>12. Twist of Main Rotor Blade (degrees)</li> <li>13. Twist of Tail Rotor Blade (degrees)</li> <li>14. Profile Drag of Main Rotor Blade</li> <li>15. Profile Drag of Main Rotor Blade</li> <li>16. Disc Loading of Main Rotor System</li> </ul>	R PM R PM TR C C TR R S TR TWSTR C DO C DO TR C DO TR
<pre>(lb/sq ft) 17. Width of the FuseLage (ft) 18. Length of the FuseLage (ft) 19. Frontal Horizontal Flat Plate Area</pre>	W DT LGH F H
20. Frontal Vertical Flat Plate Area	FV
21. Maximum Forward Velocity (knots)	M M
23. Rate of Climb, Maximum Continuous	RC
24. Hover Ceiling (IGE, in ground	HOVIGE
25. Hover Ceiling (OGE, out of ground	HOVIGE
26. Length of Tail (ft) 27. Operating Weight (lb) 28. Load Weight (lb) 29. Fuel Weight (lb) 30. Maximum Gross Weight (lb)	LT OWT LWT FWT MGW

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Parameter
Design
of
Summary

	AHóu	OH58C	ВНЗН	s 76	UH60A	CH54B	CH53 D	C 8532	AHIS	0.818
1.Main ñotor Radius (ft)	24.	17.7	31.	22.	26.8	36.0	36.1	38.5	22.0	24.2
2. Tail Rotor Radius (ft)	4.6	2.6	5.3	4.0	5.5	8.0	8.0	10.0	4.25	4.25
3. Mumber Main Rotor Blades	7	2	5	Ħ	7	9	6	7	2	2
4.Number Tail Rotor Blades	1	2	5	1	4	4	4	7	2	2
5.Height of Main Rotor above Ground (ft)	12.6	9.6	14.3	10.0	11.2	17.6	15.8	16.0	12.2	13.1
6.Speed of Main Rotor System (rrm)	289	354	203	293	258	185	185	179	324	324
7.3peed of Tail Rotor System	1.4	2.55	1.24	1.61	1.19	. 631	. 792	669.	1.65	1.65
B.Chord of Main Rotor (ft)	1.75	1.08	1.52	1.29	1.75	1.97	2.17	2.44	2.5	1.75
9.Chord of Tail Rotor (ft)	.83	- 44	. 61	- 54	. 81	1.28	1.28	1.28	.92	.70
10.Span Hain Rotor Blade (ft)	18.8	16.2	29.3	25.0	23.3	29.8	28.9	28.6	18.9	22.0
11.Span Tail Rotor Blade (ft)	3.1	2.3	ч.0	3.3	4.25	6.45	6.45	8.53	3.9	3.8
12. Tvist of Main Rotor Blade	6 -	- 10 . 6	- 8	- 10	- 18	- 8	-6	- 13.6	- 10	- 10
13. Twist of Tail Rotor Blade	-8.8	0.0	0.0	- 8	- 18	- 8	- 8	- 8	0	0
14. Profile Drag of Main Rotor Blade	600 *	6 00 -	- 009	•000	.008	.0095	-0095	.009	-008	.008
15.Profile Drag of Tail Rotor Blade	6 0 0 •	- 00 9 5	-0105	.015	.008	.0105	- 0095	- 0095	.011	.011
16. Disc Loading of Main Rotor (18/52 ft)	8.1	4.68	96-96	6.58	8.95	10.3	10.3	15.0	6.57	5.25
17. Width of Fuselage (ft)	3.96	4.57	7.08	7.0	7.75	7.08	8.83	8.83	11.7	8.6
16.Length of Fuselage (ft)	49.1	23.0	55.2	43.4	50.1	70.2	67.2	0.96	44.8	41.4
19. Prontal Horizontal Flat Plate Area (so ft)	45.8	13.0	31.2	11.6	25.7	65.0	47.3	63.6	22.3	19.3
20. Frontal Vertical Flat Plate Area (sc ft)	34.7	15.8	36.0	30.0	30.8	<b>h</b> • 66	90-06	120.	37.0	39.2
21.Maximum Forward Velocity	154	116	120	155	156	110	164	146	190	120
22.Maximum Range (nm)	246	330	505	th C th	275	200	242	4 00	290	266
23.Rate of Climb (1000 fpm)	2.88	1.42	1.31	1.35	- 45	1.7	2.18	2.75	1.62	1.6
24.Hover Ceiling(IGE, 1000 ft)	14.2	7.1	3.7	6.2	7.8	6.3	14.0	6.0	12.2	12.5
25.Hover Ceiling (OGE, 1000 ft)	11.02	4.2	4.0	2.8	3.9	2.4	8.0	1.4	5.0	4.0
Zö.Length of Tail (ft)	29.7	15.2	36.6	2ó.5	31.5	4,4.5	44.5	48.0	21.7	20.9
27.0perating Weight (1000 lbs)	11.02	1.155	13.6	5 <b>.</b> ó	10.68	19.23	23.63	33.23	6-60	5.21
28.Load Weiyht (1000 lts)	2.021	. 99.5	1.759	2.517	7.226	14.19	14.03	24.79	1.64	2.869
29.Fuel Verght (1300 lbs)	1.624	- 4	5.641	1.883	2.345	8.58	4.338	15.48	1.76	14.26
30.Max Gross Weight (1000 lbs)	14.6	2.55	21.0	10.0	20.25	42.0	42.0	73.5	10.0	9.5

### TABLE 4

Selected Design Parameter Values



#### Figure A. 1 AH64 Planform.



Bell OH-58A Kiowa turbine-powered light observation helicopter in US Army service (Norman Taylor)



Figure A.2 OH58C Planform.


Sikorsky 8H-3H multi-purpose helicopter for A8W and expansion of fleet missile defence

SIKORSKY - AIRCRAFT: USA 471

Sikorsky SH-3H twln-engined multi-purpose amphibious helicopter (Pilor Press)

# Pigure A.3 SH-3H Planform.



Sikorsky AUH-76 armed utility helicopter, with externally mounted anti-armour missiles



Figure A. 4 S-76 Planform.



UH-60A Black Hawk, equipped with external stores support system, carrying 16 Hellfire missiles in flight qualification test



Figure A.5 UH-60A Planform.



Pigure A.6 CH-54B Planform.



Pigure A.7 CH-53D Planform.



Sikorsky CH-53E Super Stallion heavy-lift helicopter (three General Electric T64-GE-416 turboshaft engines)-



Sikorsky CH-53E Super Stallion heavy-lift helicopter (Pilor Press)

Figure A.8 CH-53E Planform.



Pigure A.9 AH-1S Planform.



Bell HH-1H Iroquois local base rescue helicopter in USAF service



Pigure A.10 UH-18 Planform.

## APPENDIX 3

CRITICAL DESIGN PARAMETER PAIRINGS AND REFERENCE SYSTEM

#### TABLE 5

Main Rotor Radius Pairings

	1 2	_	MAIN ROTOR ELADE RADIUS IN FEET TAIL ROTOR ELADE RADIUS IN FEET	
	1 3	-	MAIN ROTOR ELADE RADIUS IN FEET NUMBER OF MAIN ROTOR BLADES	
	1 4	-	MAIN RCTOR BLADE RADIUS IN FEET NUMBER OF TAIL ROTOR BLADES	
	<b>1</b> 5	-	MAIN ROTOR ELADE RADIUS IN FEET HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET	
	1 6	-	MAIN ROTOR BLADE RADIUS IN FEET SPEED OF JAIN ROTOR SYSTEM IN RPM	
	1 7	-	MAIN RCTOR ELACE RADIUS IN FEET SPEED OF TAIL FOTOR SYSTEM IN RPM	
	1 8	-	MAIN ROTOP BLADE RADIUS IN FEET CHORD OF MAIN ROTOR BLADE IN FEET	
	1 9	-	MAIN RCTOR ELADE RADIUS IN FEET CHORD OF TAIL FOTOR BLADE IN FEET	
	1 10	-	MAIN ROTOR ELADE RADIUS IN FEET SPAN OF MAIN ROTOR BLADE IN FEET	
	1 11	-	MAIN ROTOR BLADE RADIUS IN FEET SPAN OF TAIL ROTOR BLADE IN FEET	
	1 12	-	MAIN PCTOR ELADE RADIUS IN FEET TWIST OF MAIN ROTOR BLADE IN DEGREES	
{ X	1 13	-	MAIN ROTOR BLADE RADIUS IN FEET TYIST OF TAIL ROTOR BLADE IN DEGREES	
	1 14	-	MAIN ROTOR ELADE RADIUS IN FEET PEOFILE DRAG OF MAIN ROTOR ELADE	
XX	1 15	-	MAIN ECTOR ELADE RADIUS IN FEET PROFILE DRAG OF TAIL EOTOR ELADE	
XX	1 16	-	MAIN ROTOR ELADE RADIUS IN FEET DISC LOADING OF THE MAIN ROTOR SYSTEM	1
XX	1 17	-	MAIN RCTOR ELADE RADIUS IN FEET WIDTH OF THE FUSELAGE IN FEET	

1 18	-	MAI LEN	N G I	R H	07 0	0 ) F	R	T	EL HE	A	D	E J S	E E	ACL	) I G	U E	S I	IN	И	ī	F H E H	EI	Ţ						
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Tail Rotor Radius Pairings

ΧХ	2 3	-	TAIL ROTOR BLADE RADIUS IN FEET NUMBER OF MAIN ROTOR BLADES	
	2 4	-	TAIL ROTOR BLADE RADIUS IN FEET NUMBER OF TAIL ROTOR BLADES	
ХХ	2 5	-	TAIL ROTOR BLADE RADIUS IN FEET HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET	
XX	2 6	-	TAIL ROTOR ELADE RADIUS IN FEET SPEED OF MAIN FOTOR SYSTEM IN RPM	
	2 7	-	TAIL ROTOR ELADE RADIUS IN FEET SPEED OF TAIL ROTOR SYSTEM IN RPM	
ХХ	2 8	-	TAIL ROTOR ELADE RADIUS IN FEET CHORD OF MAIN ROTOR BLADE IN FEET	
	2 9	-	TAIL ROTOR BLADE RADIUS IN FEET CHORD OF TAIL ROTOR BLADE IN FEET	
ХХ	10 10	-	TAIL ROTOR ELADE RADIUS IN FEET SPAN OF MAIN ROTOR BLADE IN FEET	
	1 <sup>2</sup> 11	-	TAIL ROTOR BLADE FADIUS IN FEET SPAN OF TAIL RCTOR BLADE IN FEET	
ХХ	2 12	-	TAIL ROTOR BLADE RADIUS IN FEET TWIST OF MAIN ROTOR BLADE IN DEGREES	
	2 13	-	TAIL RCTOR BLADE RADIUS IN FEET TWIST OF TAIL ROTOR BLADE IN DEGREES	
XX	2 14	-	TAIL ROTOR BLADE RADIUS IN FEET PROFILE DRAG OF MAIN ROTOR ELADE	
	2 15	-	TAIL ROTOR BLADE RADIUS IN FEET PROFILE DRAG OF TAIL ROTOR BLADE	
	2 16	-	TAIL ROTOR BLADE RADIUS IN FEET DISC LOADING OF THE MAIN ROTOR SYSTEM	1
XX	1 <sup>2</sup> 17	-	TAIL ROTOR ELADE RADIUS IN FEET WIDTH OF THE FUSELAGE IN FEET	
XX	2 18	-	TAIL ROTOR ELADE RADIUS IN FEET LENGTH OF THE FUSELAGE IN FEET	

ХX	2 19	-	TAIL ROTOR ELADE RADIU FRONTAL FLAT PLATE ARE	S IN FEET A IN SQUARE FEET
УХ	20 20	-	TAIL ROTOR BLADE RADIU VERTICAL FLAT PLATE AR	S IN FEET EA IN SQUARE FEET
	2 21	-	TAIL RCTOR BLADE RADIU MAXIMUM VELOCITY IN KN	S IN FEET CTS
XX	2 22	-	TAIL ROTOR BLACE RADIU MAXIMUM RANGE IN NAUTI	S IN FEET CAL MILES
	2 23	-	TAIL ROTOR ELADE RADIU RATE OF CLIMB IN FEET MAXIMUM CONTINUOUS POW	S IN FEET PER MINUTE, ER
	2 24	-	TAIL ROTOR ELADE RADIU HOVER CEILING (IN GROU IN FEET	S IN FEET ND EFFECT)
	2 25	-	TAIL ROTOR ELACE RADIU HOVER CEILING (CUT OF IN FEET	S IN FEET GROUND EFFECT)
	2 26	-	TAIL RCTOR BLADE RADIU LENGTH OF THE TAILBOOM	S IN FEET IN FEET
	2 2 <b>7</b>	-	TAIL ROTOR ELADE RADIU OPERATING WEIGHT IN PO	S IN FEET UNDS
	2 28	-	TAIL RCTOR ELADE RADIU LOAD WEIGHT IN POUNDS	S IN FEET
XX	2 29	-	TAIL ROTOR ELADE RADIU FUEL WEIGHT IN POUNDS	S IN FEET
	2 30	-	TAIL ROTOR BLADE RADIU MAXIMUM GROSS WEIGHT I	S IN FEET N. POUNDS

	34	-	NUMBER OF MAIN FOTOR BLADES NUMBER OF TAIL ROTOR BLADES	
	35	-	NUMBER OF MAIN ROTOR BLADES HEIGHT OF MAIN ROTOR SYSTEM ABOVE GROUND IN FEET	
	36	-	NUMBER OF MAIN ROTOR BLADES SPEED CF MAIN FOTOR SYSTEM IN RPM	
	3 7	-	NUMBER OF MAIN ROTOR BLADES SPEED OF TAIL ROTOR SYSTEM IN RPM	
	30		NUMBER OF MAIN FOTOR BLADES CHORD OF MAIN ROTOR BLADE IN FEET	
ХХ	3 9	-	NUMBER OF MAIN ROTOR BLADES CHORD OF FAIL ROTOR BLADE IN FEET	
	3 10	-	NUMBER OF MAIN ROTOR BLADES SPAN OF MAIN ROTOR BLADE IN FEET	
XX	3 11	-	NUMBER OF MAIN ROTOR BLADES SPAN OF TAIL RCTOR BLADE IN FEET	
	3 12	-	NUMBER OF MAIN ROTOR BLADES TWIST OF MAIN ROTOR BLADE IN DEGREES	
XX	3 13	-	NUMBER OF MAIN FOTOR BLADES TWIST OF TAIL FOTOR BLADE IN DEGREES	
•	3 14	-	NUMBER OF MAIN ROTOR BLADES PROFILE DRAG OF MAIN ROTOR ELADE	
ХХ	3 15	-	NUMBER OF MAIN ROTOR BLADES PROFILE DRAG OF TAIL ROTOR ELADE	
	3 16	-	NUMBER OF MAIN ROTOR BLADES DISC LOADING OF THE MAIN RCTOR SYSTEM	
	3 17	-	NUMBER OF MAIN ROTOR BLADES WIDTH OF THE FUSELAGE IN FEET	
	3 18	-	NUMBER OF MAIN ROTOR BLADES LENGTH OF THE FUSELAGE IN FEET	
	3 19	-	NUMBER OF MAIN ROTOR BLADES FRONTAL FLAT PLATE AREA IN SQUARE FEED	C

Number of Main Botor Blades Pairings

X	3 20	-	ИU VE	I M I R	BT	ĒI	R C	A .	D F L	F	ML	A A	I I T	N ]	REL	0 A	T( T	DR E	A	BR	LA E A	D	EI	S N	S	ν!	U i	A R	E	F	EET	F
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	3 27	-	N U O P	ME	B R	E A	R T	) I 1	) F NG	•	M W	A E		N G I	R HT	0		OR N	₽	B O	LA UN	D D	E S	S								
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Number of Tail Rotor Blades Pairings

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	21	-	IMBER OF TAIL ROT XIMUM VELOCITY I	IOR BLADES IN KNOTS
XX	4 22		IMBER OF TAIL ROT XIMUM RANGE IN N	TOR BLADES VAUTICAL MILES
XX	4 23	-	IMBER OF TAIL KOT TE OF CLIMB IN F XIMUM CONTINUOUS	IOR BLADES FEET PER MINUTE, 5 POWER
	4 24	-	IMBER OF TAIL ROT OVER CEILING (IN I FEET	GROUND EFFECT)
	4 25		IMBER OF TAIL ROT VER CEILING (CUT FEET	OR BLADES OF GROUNE EFFECT
	4 26	-	MBER OF TAIL ROT NGTH OF THE TAIL	IOR BLADES BOOM IN FEET
	2 <b>7</b>		IMBER CF TAIL ROT PERATING WEIGHT I	OR BLADES IN POUNDS
	4 28	-	LABER OF TAIL ROT DAD WEIGHT IN POU	COR BLADES INDS
	4 29	-	IMBER OF TAIL ROT DEL WEIGHT IN POU	IOR BLADES INDS
	4 30	-	MBER OF TAIL ROT XIMUM GROSS WEIG	OR BLADES SHI IN POUNDS

# Height of Main Botor System Pairings

	5	-	HEI GRO	GF	ΤÌ	OH	7 J	MF	A] FF			ΕO	IC	DR		S	YS	Τ	Ξ	N	A	В	0V	ΓE			
	6	-	SPE	ĔĬ	) (	DÊ	. <del>N</del>	Ã	Īi	ī	R	οτ	OF	2	S	Y	ST	Ε	M		IN		RE	° M			
ХX	5	-	HEI	Gi	IT		3	ME	A I	ע די		RO	TC	DR		S	YS	T	Ε	Μ	A	B	OV	ΤE			
	7	-	SPE	Ē	) (	DĒ	T	Â	ĪÌ	-	R	ΟΊ	OE	ł	S	Y	ST	E	M		IN		RE	۶ M			
	5	-	HEI	GE	TI	01		ME	A	E N am		πO	IC	DR		S	YS	Τ	Ξ	Μ	A	В	01	ΤE			
	8	-	СНО	RI	)	DĒ	Ч	Ā	ĪÌ	ī	F	ΟT	OF	ł	В	L	A D	Ē		II	R	F	ΞE	Τ			
ХХ	5	-	HEI	GE	TI	OI		M	AI	I N		RO	IC	DR		S	YS	Τ	E	Μ	A	В	07	ΤĒ			
	9	-	CHO	RI		DE	Ţ	Â	ĪĪ	i I u	R	ΟT	OF	2	В	L	A D	E		I	N	F	ΞE	ΞT			
XX	5	-	HEI	GE	T	OI	7 	Щ Ц	A			ΕO	IC	DR		S	YS	Т	Ε	M	A	В	01	ΤE			
	10	-	SPA	N	01	E 5	1 A	Î	N	R	0	TO	R	В	L	A	DE		I	N	F	Έ	ĒĴ	-			
XX	5	-	HEI	GE	ΤĮ	<u>OI</u>	7	M	AJ			FO	TC	DR		S	YS	Т	Ε	Μ	A	В	70	ΤE			
	11	-	SPA	N	01	E 1	C A	r I	Ľ	E E	0	то	R	В	L	A	DE		I	N	F	E	Εī	-			
ХХ	5	-	HEI	Gi	ΪŢ	<u>OI</u>	7	M	Al			RO	TC	DR		S	YS	Т	E	M	A	В	0V	ΤE			
	12	-	GRO TWI	u I SI	ч D С — С	DF (	k K	r A		1 1	R	ΟT	OF	2	В	L	A D	Ε		I	R	D	EG	R	ΕI	ΞS	
XX	5	-	HEI	GH	ΤI	01	2	М	A			ΕO	IC	DR		s	YS	T	Ε	M	A	В	70	ΤE			
	13	-	GRO TWI	U N SI	1 D 2 - (	II DF	۲ ۲	r A	EI	ΞT	R	ΟT	OF	2	в	L	AD	Ε		I	M	D	EG	R	EI	ΞS	
	5	-	HEI	GH	ΤI	OI	?	M	AI	EN		RO	IC	DR		S	YS	T	Ξ	М	A	В	0 V	ΓE			
	14	-	GRO PRO		ND LI	II I E	1 ) R	FA	E I G	ET O	F	M	AJ	EN		R	OT	0	R	j	ΕL	A	DE	2			
XX	5	-	HEI	GE	ΙT	OI		М	AJ	E N		RO	TC	DR		s	YS	Т	Ε	M	A	В	01	ΓE			
	15	-	GRO PRO	UÌ FI	ND Ll	II I E	I D R	F A	E E G	ET O	F	Т	AJ	[L		R	OT	0	R	]	EL	A	DE	2			
	5	-	HEI	GE	ΗT	OI	7	M	AC	E N		RO	IC	DR		s	ΥS	Т	E	M	A	B	0 V	ΓE			
	16	-	GRO DIS		ND L(	II DAI	₹ DI	F N	E I G	ET O	F	Т	HH	Ξ	М	A	IN		R	C î	IO	R	0	5Y	SI	ſΞ	М
	5	_	HEI	GE	ΗT	OI	?	Μ	AJ	[ N		RO	TC	DE		s	YS	Τ	E	М	A	ā	٥v	ΓE			
	17	-	GRO WID	U h TH		II FC	1 T	F H	E F E	ET F	0	SE	LA	١G	Е		IN		F	El	ΞT						
	5	_	HEI	GE	ΙT	OI	<b>?</b>	M	AC	EN		ΕO	IC	DR		s	YS	т	E	M	A	Б	٥v	ΓE			
	18	_	GRO LEN	UN GJ	ID TH	IÌ	ł	F	E H H H	ΞT	F	បន	EI	77	G	E	I	N		Fl	ΞE	Т					
	5	-	HEI	GE	II	CI	7	М	A I	E N		ΕO	TC	DR		s	YS	Т	E.	M	A	B	٥v	Ξ			
	19	_	GRO FRO	U N N T	ND CAI		I I I	FA	ĒĒ T	ĒŢ	L	AT	E	A	R	Ε	A	I	N		50	U	A E	Ε	Ī	ĒĒ	ET
	5	-	HET	GF	ΙT	01	-	M	AI			RO	IC	R		S	YS	Т	Ξ	M	A	В	OV	ΓE			
	20	-	GRO	UN			I F	FL	EI	Ť	P	ΓJ	TF	2	A	R	EA	-	I	N	S	Ú	UA	R	F	F	EET
	5	_	HET	GF	т. Т	01	7	M	A 1	- א ז	-	 60	TC	)R	••	S	YS	Т	E	M	A	E	01	ΤĒ	-		
	21	_	GRO	UN	N D I UIM	II	I I F	F	ĒĒ	T	7	Y	TN	1	К	N	OT	S	_				- •	-			
	÷ .		1111 12	-		•	· _	~	~	-	-	-		•	••		~ *	-									

ΧХ	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	22	-	MAXIMUM RANGE IN NAUTICAL MILES
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	23	-	RATE OF CLIMB IN FEET PER MINUTE, MAXIMUN CONTINUOUS POWER
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	24	-	HOVER CEILING (IN GROUND EFFECT) IN FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	25	-	HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	26	-	LENGTH OF THE TAILBOOM IN FEET
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	27	-	OPERATING WEIGHT IN POUNDS
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	28	-	LOAD WEIGHT IN POUNDS
ХХ	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	29	-	FUEL WEIGHT IN POUNDS
	5	-	HEIGHT OF MAIN ROTOR SYSTEM ABOVE
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

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Speed of Main Rotor Pairings

	6 7	-	0101	SE	E		E D E D	)	C 0	F		1 A 7 A	II	NL		RC RC	DT CT	0	R R	1010	5 Y 5 Y	S		E M E M	[	IN IN		Ri Ri	2 M 2 M					
	6 8	-			P E I C		E D R D	)	C O	[1] LL]	C Č	1 A 1 A	I	N N		FC RC	D T D T	C	R R	01	S Y BL	S A	T I D I	E M E	I	IN N	F	RI El	P M E T					
ХХ	69	-		SE	РЕ НО	Ē	E D R D	)	00	F F	יין רי	I A E A	I	NL		RC RC	)T )T	0	R R	0114	S Y B L	S A	T I D I	E M E	I	IN N	F	Ri El	P M E T					
	10 <sup>6</sup>	-	1010	S I	PE PA	;	E D N	) C	C F	5	0 <b>1</b> A		IN	N	R	F( C]	DT C	C R	R E	SI BI	5 Y L A	SD	T I E	E M L	I N	IN F	E	RI E:	P M F					
ХХ	6 11	-	0101	S E	P E P A	EE	E D N	0	0 F	F	2 C 7		I	N	a	RC O I	) T [0	C R	R	5 3 I	5 Y L A	S' D	T I E	E M	I I N	IN F	E	RI E	P M T					
	6 12	-	0101	S E C V		He	ED 51	) T	0 C	F	1 1	1 A 1 A	I	N N		FC FC	)T )T	0	R R		S Y BL	S A	T I D i	E M E	I	IN N	D	RJ E(	P M G R	E	E	5		
ХХ	6 13	-		S E C V	D E VI		ED 51	) 1	00	F	Ц Ц	I A I A	I	NL		RC F (	) T DT	0	R R	e H	5 Y 5 L	S	T I D I	E M	I	IN N	D	RJ E(	P M G R	E	ES	5		
	.6 14	-	hr 110	SE	2 2 0	H	ED	) : L	OE	F	N D F	I A A	IG	N	0	RC F	T ( K	O A	R IN	1	5 Y F	S		E M D R		IN El	А	RI Di	P M E					
ХХ	6 15		111	Ē	2 20		ED	) : L	0 E	F	े D E	I A R A	IG	N	0	RC F	T ( T	CA	R II		5 Y F	S	T I T (	E M D F	[	IN El	A	RI Di	P M E	l				
	6 16			5 E	25		ED	L	0	F A I	<u>ה</u> בכ	I A I N	IG	N	0	RC F	T T	0 H	R E	210	5 Y 1 A	SI	T I N	E M F		IN IO	R	RI	P M S Y	S	Ti	Ξt	1	
XX	6 17	-	10		РЕ D	H	E D F H	) [	C C	F	5	1 A 7 E	IE	N	F	FC US	D T E E	C	R AG		S Y E	SI	T I N	E M F	Ē	IN ET		RI	2 M					
	6 18	-	Î	E	E E		ED	) H	0	F D I	2 2	A I I	IH	N E		RC F l	)T JS	O E	R LA	2	S Y S E	S		E M N	F	IN EE	Ţ	RI	2 M	Į				
	6 19	-	0114	SE	P E RO	E	ED	) ' A	CI	F	e F I	1 A L A	II	N	P	FC I A	I ( AT	C E	R J		5 Y R E	S	Τļ	E M E N	I	IN SQ	U	RI Al	P M R E	;	F	ΞI	ΞT	
	6 20	-		SE 7 E	P E E R				O A	F	ľ I		IA	NT		FC PI	) T L A	0 1	R E		S Y A Fi	SE	T I A	E M I	N	IN S	Q	R I U I	P M A R	E	]	FI	EEC	r
	6 21	-	-	5 E 1 P	ΡE		E D I M	) I U	CM	F	7 8		I LO	NC	I	RC TY	DT Z	I I	R N	S F	5 Y ( N	S		E N S	l	IN		RI	PM					
XX	6 22	-		5 E MA	PE		E D E M	) 1 U	C	F	R A	1 A 1 N	IG	NE		FC IN	T C	C N	R AL	11	S Y T I	SC	T I A I	E M	M	IN IL	Ē	R	2 1	l				

	23 23	-	SP RA MA	E H T X I	ED E I M	C U	OF F M	C C	N LO	A I N	I M T	N B I N		10 10	ד U	OF FI S	E E D	SHO	Y W	ST PE ER	E R	Ы	М	IN IN	U	RP TE	M •	
	6 24	-	SP HO IN	E H V I I	ED ER FE	E'	CF CE T	I	M L	A I	I N	N G	E	10 (I	T N	CI	R GR	S 0	Y U	ST ND	E	M E	F	IN FE	C	RP T)	M	
	25 25	•	SP HO IN	E H V I	ED ER FE	E	OF CE T	I	M L	A I	I. N	N G	F (	i0 ( C	T U	CI T	3 0	S F	Y	ST GR	E O	M U	N	IN E	E	RP FF	M E (	CT)
XX	6 26	-	SP LE	E I N (	ED GT	Н	OF O	F	M	A T	I H	n E	FI	iO A	T I	CE LE	R 30	S 0	Y M	ST I	E N	R	F	IN EE	Т	RP	M	
	2 <sup>6</sup> 27	-	SP OP	E H E H	E D R A	1 1	OF IN	G	N	A W	I) E	N IG	E		T	OF IN	2	Sp	Y O	ST UN	E D	M S		IN		RP	М	
	6 28	-	SP LO	E E A C	E D D	W.	CF EI	G	М Н	A T	I	N I N	F	O P	T O	C I U N	R VD	S S	Y	ST	Ε	M		IN		RP	М	
ХХ	29 29	-	SP Fu	E H E I	ED	( W ]	OF EI	G	M H	A T	I	N I N	R	0 P	T O	OF UN	3 1D	S S	Y	ST	E	М		IN		RP	М	
	6 30	-	SP MA	E H X I	E D E M	ប	CF M	G	M R	A C	I S	N S	Fix	IO E	T I	C I G I	R HT	S	YI	ST N	EP	M O	U	IN ND	S	RP	M	

# Speed of Tail Rotor Radius Pairings

ХХ	7 8	-	S C	P H	50	ER	D			F. fr.	T M	A A	II II	N	RF	000	T T	0	R R	S B	Y L	ST AD	EE	M	I	I N N	ī	RF EF	M				
	<b>7</b> 9	-	S C	P H	E O	E R	D D			· · ·	T T	A A	I] I]	1.1	P. R	00	T T	0	R R	S B	Y L	ST AD	EE	М	I	IN N	F	RE Ee	n T				
XX	7 10	-	SS	P P	E A	E N	D	С	C I F	E M	T A	A I	I) N	R	R C	0 T	T O	C R	R B	S L	Y A	ST DE	E	M I	N	IN F	E	RP E1	P M				
	7 <sup>.</sup> 11	-	S	P P	E A	E N	D	0	OI F	T	Ā	A I	I] L	R	R O	0 T	T O	O R	R B	S L	Y A	ST DE	E	M I	N	IN F	E	RE El	2 M				
XX	7 12	-	S T	P W	EI	EIS	D T			<b>F</b> . <b>F</b> .	T M	A A	II Il	L N	FF	0	T	0 C	R R	S B	Y L	ST AD	E E	M	I	IN N	D	RE EC	R R	E	ES		
	7 13	-	S T	₽ ₩	EI	E S	D T		OI OI		T T	A A	I] I]		R R	00	T T	0	R R	S B	Y L	ST AD	E E	M	I	IN N	D	R F EG	P M R	E:	ES		
ХХ	7 14	-	SP	P R	E0	E F	D I	L	CI E	D	TE	A A	II G	0	RF	0	T M	O A	R IN	S	Y R	ST OT	E O	M R		IN El	A	E E	M				
	7 15		SP	P R	E O	E F	DI	L	CI E	כ	Tpi	A A	I] G	0	FF	0	T T	C A	R IL	S	Y R	ST OT	E O	N R		IN EL	I A	RE DE	e M				
	7 16	-	S D	P I	ES	E C	D	L	01 0 <i>1</i>	F I D	TI	A N	I] G	0	R F	0	T T	O H	R E	S M	Y A	ST IN	Ξ	M R	С	IN IO	R	RE	P M 5 Y	S	ΓE	М	
XX	7 17	-	S ₩	P I	E D	ΞT	D H		C1 01	· ·	T T	A H	II E	L F	R U	0 S	TE	C L	R AG	S E	Y	ST IN	E	M F	E	IN ET		EF	۲. e				
XX	7 18	-	S L	P E	E N	E G	D T	H	OI	F	Т	A T	I] Hi		R F	0 U	T S	CE	R LA	S G	Y E	ST I	E N	<u>ы</u>	F	IN EE	Т	RE	M				
	7 19	-	S F	P R	E O	E N	D T	A	CI L	F	TL	A A	II T	L P	FL	O A	T T	C E	R A	S R	Y E	ST A	E I	M N		IN SQ	σ	R 2 A F	E E		FZ	El	[
ХX	7 20	-	S ▼	P E	E R	EFI	D I	С	O I A I		E F	A L	II AC	F	R P	0 L	T A	0. T	R E	S A	Y R	ST EA	E	M I	N	IN S	Q	R E U A	R N	E	F	EI	ΞT
	7 21	-	S M	P A	E X	EI	D M	U	O I M	V	TE	A L	I1 00		FI	C Y	Т	O I	R N	S K	Y N	ST OT	ES	М		IN		RE	P M				
ХХ	<b>7</b> 22	-	S M	P A	E X	EIH	D M	U	CI M	R	T A	A N	II GI	. 11-1	RI	O N	Т	O N	r Au	S T	Y I	ST CA	ΞL	M	M	IN IL	E	RF S	M				
XX	7 23	-	SR	P A A	ΞTX	EEL	D	0	O H F M	C	TLO	A I N	II MH T	E B I N	RIU	O N C	T U	O F S	R E E P	STO	Y W	ST PE ER	E R	M	M.	I N I N	U	R F Te	2 M				

	7 24	-	S H I	PE OV N		ED ER EE	E	0 C T	E E I	II	A I I	I N	L G	R (	0 I	T N	01	R GR	S Û	U U	ST ND	Ξ	M E	F	IN FE	С	RP T)	M	
	7 25	-	S H I	PE OV N	EEPH	ED ER FE	E	C C T	F El	I I I	A I I	IN	L G	F (	0	T U	0) T	RO	SF	Y	ST GR	E O	M U	N	IN E	E	RP FF	ME	CT)
	7 26	-	S L	P E E N		ED 5 T	H	C)	F D E	Ţ	A T	I H	L E	FI	O A	I I	0] []	R BO	S O	Y M	ST I	E N	M	F	IN EE	T	RP	M	
	7 27	- -	S O	P E P E		E D R A	I	01 I1	F N G	Ţ	A W	I E	L IG	R H	0 T	Т		R N	SP	Ŷ	ST UN	E D	M S		IN		R₽	М	
	7 28	-	S L	P Z O A	EE	ED	W	C E	F I C	I H	A T	I	L I N	F	0 P	T O	C I U I	R ND	S S	Y	ST	E	M		IN		RP	M	
XX	7 29	-	S F	P E U E		D	W	OI E	F I (		A T	I	L IN	F	0 P	T O		R N D	S S	Y	ST	E	M		IN		RP	M	
	7 30	-	S M	P E A X		E D E H	U	CI M	E (	I G R	A C	I S	I S	F.S	0 E	T I	C) Gi	R HT	S	YI	ST N	E P	M 0	U	IN ND	S	RP	Μ	

Chord of Main Botor Blade Pairings

	8 9	-	C C	HC HC				CF OF	7	M T	A A	IN IL	ļ	FO RO	T	C F OF	2	BB	L L	AD AD	E			N N	FF	EE	ΞT				
	8 10		C S	E C P I		R D	С	CF F	M	M A	A I	IN N	I E	БО СТ	TO	CE R	R B	B) L	L A	AD DE	Ε	I	I) N	۱ F	FE	EH EI	ΞT				
XX	8 11	-	C S	HC P2	) F N	R D I	0	OF F	T	M A	A I	IN L	R	RO O T	T	OF R	? В	B	L A	AD DE	E	I	IN N	N F	FE	EIEI	T				
	8 12	-	C T	H ( W )		RD ST		OF OF	<b>e</b> T	M M	A A	IN IN	I.	RO FO	T T	O E O E	2	B B	L	AD AD	E E			N N	F D	EI E(	ET GR	EI	ES		
ХХ	8 13		C T	HC WI		D		OF OF	1	ř T	A A	IN II	ļ	RO F O	T	OF OF	2	B B	L. L	A D A D	EE		I) I?	1	FD	EB EG	E T GR	EI	ES		
	8 14	-	C P	HC RC	) F	R D F I	L	OF E	כ	M R	A A	IN G	0	RO F	T M	OF A J	{ EN	В	L . R	AD OT	E O	R	I) H	N BL	F A	E E D E	E T E				
XX	8 15	-	C P	H C R C	D F	D	I	OF E	D	M R	A A	IN G	0	EO F	T	CF A I	R IL	B	L R	AD OT	E O	R	II	N El	FA	E E D E	E T E				
	8 16		C D	HC IS		D	L	OF CA	D	MI	A N	IN G	0	RO F	T T	OF HI	2	B. M	L A	A D IN	E	R			F R	EE	ET SY	SC	ΓE	M	
XX	8 17		C W	H( II	) F	₹D 'H		OF OF	1	M T	A H	IN E	I F	БО US	TE	CF LA	R AG	B E	L	AD IN	E	F	II E E	N E T	F	ΞI	ET				
	8 18	-	C L	H ( E )		RD ; T	Н	OF C	F	М	A T	IN He	I C	EO FU	TS	O E E I	R LA	B G	L E	AD I	E N		IN F I	N E E	F	Eł	ΞT				
	8 19	-	C F	HC RC		D I T	A	OF L	F	M L	A A	IN T	2	RO L A	T	OF E	k A	B R	L E	AD A	E I	N	IÌ	1 5Q	FJ	EE AB	ET	ī	ΞE	ΕT	
	8 20	-	C V	HC EF	) F N I		С	CF AL	•	M F	A L	IN AT	I	FO PL	T A	OF T I	2	B. À	L R	A D E A	E	I	I1 N	N S	F V	E E U A	ET	E	F	ΞΞ	Т
	8 2 <b>1</b>	-	C M	HC A X		D M	U	OF M	v	M E	A L	IN OC		RO TY	Т	OF IN	2 1	B K	L. N (	A D O T	E S		I	1	F	ΞE	ΞT				
ХХ	8 22	-	C M	H C A X	)F	2 D M	U	OF M	R	M A	A N	IN GE	ļ	FO IN	Τ	OF N <i>A</i>	70 2	B T	L I	AD CA	E L		I I M J	N I L	FE	E! S	ΞT				
ХX	8 23	-	C E M	HC A I A X		E D	C U	CF F M	C C	M L O	A I N	IN Me TI	I S I N	FO IN UO	T	OF FE S	R EE P	BFIO	L W	AD PE ER	E R		IN Ml	N E N	F U	EE TE	ET E,				
	8 24	-	C H I	HC OV N	) F F F	2 D E R F E	E	CF CE T	I	N L	A I	IN NG	;	FO (I	T N	O F	R GR	3: 01	L U	AD ND	E	E	I) Fł	I E E	F	EE T)	ΞT				

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	8 25	-	CHC HOV IN	) R D ER FE	CI CI ET	F EI	11 A L I	INC		FO (C	T U	CR T O	BL F	, AD GR	Ξ OU	IN ND	F E E E F F	T ECT)
	8 26	-	CHC LEN	R D I G T	01 'H (	F	A N T	IN HE	ł	RO TA	T I	CR LEO	BL OM	AD I	E N	IN FEE	FEE T	Т
	8 2 <b>7</b>	-	CHC 023	) R D I R A		F NG	A N W	IN EJ	I I G	FO HT	Т	CR IN	BL 2C	A D ) U N	E DS	IN	FZE	Т
	8 28	-	CHC LOA	) R D D	OI WEI	ĒGI	A M H T	IN	I E N	RO P	T O	OR UND	BL S	AD	Ε	IN	FEE	Т
X	8 29	-	CHC FUZ	)RD L	O E W E I	ĒGI	M A H T	IN	I N	FO P	T C	CR UND	BL S	ΑD	E	IN	FEE	T
	8 30	-	СНС МАХ	RD	O I U M	G	M A R O	IN SS	5	RO WE	TI	CR GHT	BL	A D N	E PO	IN UND	FEE S	Т

Χ

# Chord of Tail Rotor Blade Pairings

ΧХ	9 10	-	CH SP	O A	R I N	0	CF F	M	1 Ā	A I	IL N	R	FO O T	TO	C E R	В	BL	L A	AD DE	Ē	I	I I N	N F	IL E	E1 E1	T				
	9 11	-	CH S P	O A	R I N	0	CF F	T	T A	A I	II L	R	FO CT	Ţ	C H R	R B	B L	L A	AD DE	Ε	I	I) N	N F	FE	E H E J	ΞT				
XX	9 12	-	CH TW	0 I	R I S I	)	O F O F	7	T M	A A	IL IN	, T	RO RO	T T	O E O E	2	D B	L L	AD AD	E		I) I)	N N	F D	EE EG	E T R	E	E S	5	
	9 13	-	CH) TW	0 I	RI Si	) -	CF OF	•	T T	A A	II IL	,	FO FO	T	C E O E	ā R	B B	L L	AD AD	EE		II II	N N	F D	E E	ET ; R	E	E3	5	
XX	9 14		CH PR	00	RI FI	) I I	OF E	כ	ΤŔ	A A	II G	́с	RO F	T M	CE Al	R In	B	L R	AD OT	E O	R	I	N E L	FA	EI DI	E T E				
	9 15	-	CH( PR(	0	RI FI	) [ L	OF E	D	T R	A A	IL G	0	RO F	ΗĘ	O E A J	R EL	В	L R	AD OT	E O	R	II	N B L	FA	E E D E	ΞT				
XX	9 16		CH	0 S	R I C	) L	CF OA	D	T I	A N	II G	0	FO F	T	OE H I	RE	B M	L A	AD IN	E	R	I   07	N I C	FR	ER	ET SY	S	ΤI	EM	
ХХ	9 17		CH VI	O D	R I T i	) H	OF CF	7	T T	A H	IL E	F	RO U S	TE	OF L/	R AG	BE	L	AD IN	E	F	I) Ej	N E T	F	EB	ΞT				
XX	9 18	-	CH LE	O N	RI G]	) ] H	CF O	F	T	A T	II HE		EO FU	T S	OI EI	R La	B G	L E	AD I	E N		I F	N EE	F T	Eł	ΞT				
XX	9 19	-	CH FR(	0	R E N I	) . A	CF	F	T L	A A	IL I	, DI	FO L A	T	O E	R A	B R	L Ē	AD A	E I	N	I	N SQ	E U	EI AI	E T R E		FI	E E'	Т
XX	9 20	-	CH VE	O R	R I T I	) [ C	CF AL	•	T F	A L	IL A T	7	RO PL	T A	OF TI	RE	B A	L R	AD EA	E	I	I I N	N S	FIQ	E H U A	ET	E	I	Ē	ΕT
	9 21	-	CH MA	0 X	RI IM	) I U	CF M	V	[] L	À	II OC	ÍI	FO IY	T	OF IN	R	B K	L N	AD OT	E S		I	N	r	EI	ΞŢ				
	9 22	-	CH( MA	C X	R E I M	) 1 U	OF M	R	T A	A N	II GE		RO IN	Т	O E N I	yn Yn	BEI	L I	AD CA	E L		II Mi	N IL	FE	E S	ΞT				
XX	9 23		CH RA MA	O T X	RI E I M	) 0 1 U	OF F M	C C C	T L O	A I N	IL Me TI	S N	RO IN UC	T U	OF FI S	R EE P	10 TO	L W	AD PE ER	E R		II Mi	N I N	F U	E E T F	ET				
	9 24		CH HO IN	V	R I E F F F	) E E	OF CE T	I	T L	AI	IL NG		RO (I	T N	OF	R GR	B O	L U	A D ND	E	E	I) Fl	N F E	F	EE T)	ΞT				
	9 25	-	CH HO IN	V V	RI EF FE		OF CE T	ÏI	T L	A I	IL NG	,	RO (C	TU	OF T	20	BF	L	AD GR	E O	U	I I NI	N D	FE	EE FI	ΞT	C	T)		

	9 26	-	CHOR: LENG	CI CH (	F I DF	A T	IL HE	RO T A	TO Il	R BO	BL OM	I AD	E N	IN FEE	FEET T
	9 2 <b>7</b>	-	CHORI OPERI		F T IG	A W	IL EIG	RO HT	TO I	R N	BL PO	A D UN	E D S	IN	FEET
	9 28	-	CHORI LOAD	D CI WEI	F T EGĤ	A T	IL IN	RC P	T C O U	R ND	BL S	AD	E	IN	FEET
ХX	9 29	-	CHORI FUEL	W E	F I IGH	A T	IL IN	RO P	T O U O	R ND	BL S	AD	Ε	IN	FEET
	9 30	-	CHORI MAXIN	CI 1 U M	F T GR	A O	IL SS	FO WE	TC IG	R HT	BL	AD N	E PO	IN UND	FEET S

Span of Main Rotor Pairings

	10 11	-	Si Si	PA PA	N N	C C	F F	ER	F F	I	N L	R	000	T	0 C	RR	BB	L	A A	DI DI	202	I	N N	E	Ē	EE	T T					
	10 12	-	SE	PA VI	N SI	0	F OF	M	A M	I A	N IN	R	O R	T O	0 T	R CF	В	L B	A L	DĒ Al	E D E	I	N I	N N	E D	EE	T G R	E	ĒĒ	S		
XX	10 13	-	S I TV	FA	N SJ	С	F O F	M	A T	I A	N II	R	C R	TO	O T	R CF	B	L B	A L	CH AI	E D E	I	N I	N N	E D	E	T G R	E	ΞE	S		
	10 14	-	SI Pi	2 Å 2 O	N F I	CL	F E	11 D	A R	I A	N G	R C	O F	Τ	0 M	R Aj	B IN	L	A R	DH O]	E C O	I R	N	EI	ΕE	E D	T E					
XX	10 15	-	SI PE	PA RO	N F I	C L	FE	M D	A R	I A	N G	F O	CF	Т	O T	R A J	З L	L	A R	DI OJ	2 00	Hg	N	H EI	EA	ED	T E					
	10 16	-	SI DI	PA IS	N C	C L	F OA	M D	A I	I N	N G	RO	C	Τ	0 T	R H I	B	L M	A A	DA IN	E V	I R	N G	I I C	F E D R	E	T S Y		5T	E	M	
	10 17	-	SH W I	P A I D	N TH	C	F OF	М	A T	I H	N E	RF	C	T	0 E	R LA	BIG	L E	A	DI IN	E V	I F	N E	E E J	Ē	E	T					
	10 18	-	SI LI	P A E N	N G I	C H	FC	M F	A	I T	N H H	R E	C F	T U	C S	R EI	B	L G	A E	DI	e I N	Ŧ	N F	I E E	E	E	T					
	10 19	-	SI Fi	P A RO	N N T	O A	FL	e E	A L	I A	N T	22	0 L	T A	OT	R E	B A	L R	A E	DI A	EI	I N	N	ī Sζ	E D U	E A	T R E	5	F	Έ	ΕT	
	10 20	-	SI VI	PA Er	N TI	0	F AI	M	A F	I L	N A I	R	C	TL	O A	R TI	B	L A	A R	DI E I	Ξ	I I	N N	Hol	E E Q	E	T A F	2 1	Ε	F	ΕΞ	T
	10 21	-	SI MA	P A A X	N I S	0 1 U	F M	M V	A E	I L	N O (	E	0 1	T Y	0	R I)	B	L K	A N	DI OJ	e C S	I	N	F	Ē	[t]	Т					
XX	10 22	-	SI MA	P A A X	N I M	C I U	F M	M R	A A	I N	N G I	E	CI	TN	0	R NA	B	L T	A I	DI CA	E A L	I	N M	I II	Ē	ES	T					
	10 23	-	SI RI MI	PA AT AX	N E I M	00	F F M	MCC	A L O	I I N	N MH T I	R B I N	C I U	T N	Ω 0	R Fi S	BER	LTO	A W	DI PI EI	E E R	I	N M	IN	7 E 1 U	EI[-	T E,					
	10 24	-	SI H( I)	2 A 2 V V C	N E H F H	C ? E E	F CE T	M I I	AL	I I	N N (	G R	(	TI	O N	R	BR	L O	A U	D I NI	Ξ	IE	N F	F I	EC	ET	Т )					
	10 25	-	SI HO IN	PA DV N	N EH FH	C 2 E	FCE	K I	A L	I I	N N (	G Fi	(	T C	0	R T	B O	L F	A	DI GI	20	IJ	N N	נכ	F E E	E E F	F	EC	CI	:)		
	10 26	-	S) L)	P A E N	N G 1	С ГН	F	M F	A	I I	N H I	E	C T	TA	0 I	R LH	В 30	LO	A M	DI	e I N	I	N F	E I	F E E T	Ξ	T					

	10 27	-	SPAN OPERA	OF	MA IG Î	LN WEI	GHT	OR IN	I PC	DEDUND	IN S	FEET
	10 28	-	SPA N LOAD	OF WEI	MA GHI	IN I I	ROT N P	O R O U N	BLA IDS	DE	IN	FEET
XX	10 29	-	SPAN FUEL	CF WEI	MA GH 1	IN I I	RCT N P	OR CUN	BLA DS	DE	IN	FEET
	10 30	-	SPAN MAXIM	O F U M	M A I G R C	IN DSS	ROT WE	OR IGH	BLA IT I	DE N P	IN OUN	FEET DS

Span of Tail Rotor Pairings

	11 12	-	SP/ TW:	A N E S 1	C C	F OF	T	A M	I A	L I N	R	0 R	T ( 07	0 T	R CI	B	L B	A L	DE AI	E E	I	NI	F N	E D	EIE	T GR	Ē	ES		
	11 13	-	SP) IV:	AN Est	0	F OF	T	A T	I A	L IL	R	O R	Т ( О '	O T	R Of	B	L B	A L	DE Al	E E	I	N I	F N	Ъ Д	EE	T G R	E	ES		
XX	11 14	-	S Pi PR(	A N D F I	C	FE	T D	A R	I A	L G	R C	0 Ē	T	O M	R A I	B IN	L	A Fi	DE OI	20	I R	N	F EI	E A	E D	T E				
	11 15	-	SPI PRC	A N D F I	CL	FE	T D	A R	I A	L G	R O	O F	Τļ	O T	R A 1	B IL	L	A R	DE OI	20	I R	N	F E I	E A	E D	T E	•			
ХХ	11 16	-	SP) DIS	AN 5C	C L	F OA	T D	À I	I N	L G	6 0 1 0	C F	T	O T	R H1	B	L M	A A	DE IN	E	I R	N C	F IC	F E R	E	T S Y	S	ΓE	M	
XX	11 17	-	S22 WII	N A D T S	H C	F CF	T	A T	I. H	L E	R F	C U	T( S	O E	R Li	B AG	L E	A	DE IN	E	I F	N E	F E I	Έ	E	T				
XX	11 18	-	SP) LE:	AN G'	С ГН	F	T F	A	I T	L H E	R	C F	T ( U :	0 S	ā El	B LA	L G	A E	DE	E N	I	N F	F E E	Έ Τ	E	Τ				
	11 19	-	S P I F R (	N A D N C	C F A	F	T F	A L	I A	L T	F P	C I	T ( A'	O T	R E	B A	L R	A E	DE A	E I	I N	N	F SÇ	E U	E A	T R E		FΕ	ET	
	<b>1</b> 1 20	-	S PI Vee	A N R T I		F AL	T	A F	I L	L A T	R	0 P	T ( L .	O A	R Tl	EB	L A	A R	DE E A	E A	I	N N	H OJ	E SQ	E U	T A R	E	F	ΞE	T
	11 21	-	SPI MAI	A N KI (	C 1 U	F	T V	A E	I	L CC	RI	C T	T ( Y	0	ā Il	B	L K	A N	D I O I	: S	I	N	F	Ē	Ξ	Т				
XX	11 22	-	SP/ MAX	A N CIN	0 1 U	F M	T R	A A	I N	L G E	R	0 I	T ( N	0	R N A	AU B	L T	AI	DE CA	EL	I	N M	F	EIEI	E S	T				
ХХ	11 23	-	S PI RAT MAJ	AN FE KI!	0 1 U	FFM	T C C	A L O	I I N	L MB TI	F. N	C I U	T ( N Ol	0 U	R FI S	BER	L T O	A W	DE PE EF	E R	I	N M	FIN	יב 10	ET	Τ,				
	<b>11</b> 24	-	SPI HOV IN	A N V E H F H	R R E E	F CE T	T I	A L	I	L NG	R	0 (	T( I	0 N	R (	В GR	L O	A U	DE NE	E )	I E	N F	F E	E C	EF	T )				
	11 25	-	SPI HO IN	AN VEI FI	R E E	F CE T	TI	A L	I	L NG	R	0 (	T ( Ci	0	R T	B O	L F	A	DE GE	20	IJ	N N	D D	E E	Elfq	T FE	C	I)		
	11 26	-	SPILE	A N N G 1	С	F	TF	A	II	L HE	R	01	T ( A	0 I	R LH	B 50	LO	A M	DE	E N	I	N F	FEE	ET	E	Т				

	11 27	-	SPA N OPERA	CF TIN	T A G	U I W E	I	R C 1 G H 1	0	R IN	BL P	A O	DE UN:	I DS	N	F	ΕI	ET
	11 28	-	SPAN LOAD	OF WEI	T A G H	II T	Ί	RO' N i		R U N	B L D S	A	DE	I	N	F	E)	ΞT
XX	11 29	-	SPA N FUEL	CF WEI	T A G H	II T	I	RO1 N I	020	R UN	B L D S	A	DE	I	Ν	F	Ξ	ΞT
	11 30	-	SPA N MAKIM	CF UM	T A G R	II	s	RCI WI		R GH	BL T	A I	DE N	I PO	N U	F ND	ES	ΕT

# Twist of Main Rotor Blade Pairings

	12 13	_	T T	W . 7	I	S' S'	T			7	M T	A A	II II	N.	F			C F O R	ì	B	L.	A D A D	E		I N I N		D D	EG EG	R	E	ES ES		
	12 14	-	ΗP	W. R	I O	S	T I	L	O B E	D	M R	A A	I! G	N O	F	0'	T ( M	CF Al	i IN	B	L R	A D OT	E O	R	IN E	L.	D   A	EG DE	R	E	ΞS		
ХХ	12 15	-	T P	N R	I O	S' F	T I	L	OF E	D	M R	A A	IN G	0	R F	0	T ( T )	D R A I		B	Ĺ. R	AD OT	ΞO	R	IN E	L	D I A I	EG DE	R	E	ES		
	12 16	-	T D	N) I	I S	S' C	T	L	O F O A	D	M I	A N	II G	N 0	F	0		C F H E	2	B: M	L A	AD IN	Ε	R	N I N OT	01	D R	EG S	R Y	E S'	ES TE	M	
XX	12 17	-	T W	W I	I D	ST	T H		O F C F	7	M T	A H	IN E	I F	R U	oʻ S	T ( E :	DR LA	G	B E	L	A D IN	Ē	F	IN EE	T	D	EG	R	E	ES		
ХX	12 18	-	T L	W E	I V	S' G	T	H		F F	[1	A T	II HJ	N E	R F	0' U	T I S I	CF EI	} LA	B G	L E	AD I	E N		IN FE	Ε	D T	EG	R	E.	ES		
XX	12 19	-	T F	R R	I O	S' N	T.	A	CF L	F	M L	A A	II T	N P	FL	0' A'	T ( T	CF E	A	B: R	L E	AD A	EI	N	IN S	QI	D	EG A R	RE	E	ES FE	ET	
ХХ	12 20	-	T V	W E	IR	S' T	T I	C.	OF AI		M F	A L	I) A1	1 L	RP	0 ' L	T ( A '	OF I E	Ē	B: A	L R	AD EA	E	I	I N N	S	D. Q	EG JA	R R	E E	ES F	ΞΞ	т
	12 21	-	T M	W: A	I X	S' I	T M	U	O F M	v	M E	A L			FI	0' Y	T	CF IN	2 1	B K	L N	AD OT	ES		NI		D	EG	R	E	ES		
XX	12 22	-	т Н	W A	I X	S' I	T M	บ	OF M	R	M Å	A N	II Gl	N E	RI	0 ' N	T	O F N A	70 5	B T	L I	AD CA	E L		IN MI	L	D Z	EG S	R	E.	ΞS		
XX	12 23	-	HR N	W A' A	I T X	S' E I	л И	0 U	O P F M	CCC	Ч L O	A I N	I) Me T]	N B I N	RIU		T ( U :	OR FE S	EE P	B T O	L. W	AD PE ER	E R		IN MI	N	บ	EG TE	R	ΕĴ	ES		
XX	12 24	1 1	T H I	W O N	V	S' E F	T R E	E'		, II	선 L	A I	IN NC	3	R (	0' I	T ( N	З fi G	R	B O	L U	A D ND	Ð	E	IN FF	E	DI	EG I)	R	ΕĴ	ES		
XX	12 25	1	T H I	M O N	ĪV	SEF	T R E	E		EI	M L	A I	IN N(	3	R (	0' C	T( U'	AC T	0	B: F	L	A D G R	ΕO	U	IN ND		D E	EG F F	RE	E C	ES T)		
XX	12 26	-	T L	ज़ E	I N	S' G	T T	H		F	М	A T	IÌ HJ	N E	R I	0' A 1	T( I	O F L E	230	В. О	L M	AD I	E N		IN FE	E	D. T	EG	R	E	ES		
ΧX	12 27	-	T O	8 1 1 1 1 1 1	I E	S' R	T A	I	O E I N	r IG	М	A W	II El	N I G	E H	0' T	T	CF IN	S I	BP	L O	AD U N	E D	S	IN		D	ΞG	R	E	ΞS		
ХX	12 28	-	ΞL	א 0	I A	S' D	T	พ	O E J	, G	M H	A T	I	N IN	R	0' P(	T ( O	CF UN	i ID	B S	L	AD	Ε		IN		D	EG	R	E.	ES		
ХХ	12 29	-	T F	W U	I E	S L	I	W	OI E I	ĒG	M H	A T	I	N I N	E	5 0	T O		R VD	B S	L	AD	E		IN	!	D	ΞG	FR	F)	ΞS		
ХХ	12 30	-	T M	W A	IX	SI	T M	U	O I M	G	MR	A C	I SS	N 5	FW	0 E	T I	C I G I	R HT	В	L I	A D N	EP	0	IN UN	D	D S	EG	52	E	ΞS		

# Twist of Tail Botor Blade Pairings

ХХ	13 14	-	WIST OF TAIL FOTOR BLADE IN DEGREES PROFILE DRAG OF MAIN ROTOR BLADE	
	13 15	-	WIST OF TAIL FOTOR BLADE IN DEGREES PROFILE DRAG OF TAIL ROTOR ELADE	
ХХ	13 16	-	WIST OF TAIL ROTOR BLADE IN DEGREES DISC LOADING OF THE MAIN ROTOR SYSTE	H
XX	13 17	1 1	WIST CF TAIL ECTOR BLADE IN DEGREES IDTH OF THE FUSELAGE IN FEET	
XX	13 18	-	TWIST OF TAIL ROTOR BLADE IN DEGREES ENGTH OF THE FUSELAGE IN FEET	
XX	13 19	-	TWIST OF TAIL ROTCR BLADE IN DEGREES FRONTAL FLAT PLATE AREA IN SQUARE FE	ET
XX	13 20	-	TWIST OF TAIL ROTOR BLADE IN DEGREES VERTICAL FLAT FLATE AREA IN SQUARE F	EEI
XX	13 21	-	TWIST OF TAIL ROTOR BLADE IN DEGREES MAXIMUM VELOCITY IN KNOTS	
XX	13 22	-	TWIST OF TAIL FOTCR BLADE IN DEGREES MAXIMUM RANGE IN NAUTICAL MILES	
XX	13 23	-	TWIST OF TAIL ROTOR BLADE IN DEGREES RATE OF CLIMB IN FEET PER MINUTE, MAXIMUM CONTINUCUS POWER	
XX	13 24	-	TWIST OF TAIL ROTOR BLADE IN DEGREES HOVER CEILING (IN GROUND EFFECT) IN FEET	
XX	13 25	-	TWIST OF TAIL ROTOR BLADE IN DEGREES HOVER CEILING (CUT OF GROUND EFFECT) IN FEET	
XX	13 26	-	WIST OF TAIL ROTOR BLADE IN DEGREES ENGTH OF THE TAILBOOM IN FEET	
XX	13 27	-	EWIST OF TAIL FOTOR BLADE IN DEGREES OPERATING WEIGHT IN POUNDS	
XX	13 28	-	TWIST OF TAIL ROTOR BLADE IN DEGREES LOAD WEIGHT IN POUNDS	
XX	13 29	-	TWIST OF TAIL FOTOR BLADE IN DEGREES FUEL WEIGHT IN FOUNDS	
	13 30	-	IWIST OF TAIL ROTOR BLADE IN DEGREES MAXIMUM GRCSS WEIGHT IN POUNDS	

Profile Drag of Main Rotor Blade Pairings

	14 15	-	1 H H	R	0	FF	I	I L	된도	D D	R R	A A	G G	00	FF		M T	A A	IN IL		R( R(	TC TC	00	R R		EL EL	A A		616-1				
	14 16	-	H D	R I	0 S	F C	Ι	L L	E O A	D	RI	A N	G G	C	F		M T	A H	IN E	М	R( A	DT IN	0	R R	C	EL TO	A R	DI	E S Y	S	ΓE	М	
ХX	14 17	-	E IS	FII	C D	F T	I H	L	E O F	D	R T	A H	GE	014	FU	S	M E	A) L/	IN AG	Ξ	R	DT IN	0	R F	E	EL ET	A.	Di	Ξ				
XX	14 18	-	Ē	R R	0 N	F G	I T	L H	E C	D F	R	A T	G H H	E	F	σ	M S	A E	IN LA	G	RE	OT I	0 N	R	F	EL EE	A T	DI	Ξ				
XX	14 19	-	ШЩ	R	0	FN	I T	L A	E L	D F	Rĩ	A A	G I	C P	FL	A	M T	A: E	IN A	R	R( E	TC A	0 I	R N		EL SQ	A U	D I A I	E R E		FE	Ē	r
XX	14 20	-	EV	R E	O R	F T	I I	L C	E AL	D	R F	A L	G A J	C	FP	L	M A	A T	IN E	A	R R	OT EA	0	R I	N	EL S	A Q	D) U/	E A R	E	F	E	ΕT
	14 21	-	E	PR 1A	0 X	FI	I M	I U	E M	D V	R E	AL	G C (	CI	FI	Y	M	A I	IN N	K	R N	OT OT	0 S	R		EL	A	D]	Ξ				
XX	14 22	1	E N	PR I A	0 X	FI	I M	I U	E M	D R	R A	A N	G GI	C	FI	N	Μ	A I N I	IN AU	T	R I	OT CA	0 L	R	E.	EL IL	A E	DI S	Ξ				
	14 23	-	HEN	PR A I A	O T X	FEI	I	L U U	EFM	DCC	R L O	A I N	G Mi T		FIU	NO	M U	A.F.S	IN EE P	TO	E W	OI PE ER	O R	R	M	EL IN	A U	D] T]	Ε,				
	14 24	-	E	PF IC	0	E E E	IRE	I E	E CE T	D I	R L	A I	G NC	; C	) F (	I	M N	A	IN GR	0	R U	OI ND	0	R E	F	EL FE	A C	D) T)	E				
	14 25		H H I		0	FEF	I R E	I E	E CE T	DI	RL	A I	G NC	30	; F (	С	M U	A T	IN O	F	R	OT GR	0	R U	N	EL C	A E	D. Fi	E FE	C	I)		
XX	14 26	-	E	R E	0   N	F G	II	I H	EC	D F	R	A T	G H I	C E	) F T	A	M I		IN BO	0	R) M	OT I	O N	R	F	EL EE	A T	D	E				
	14 27	-	C	R PP	0E	F R	IA	L I	E IN	D G	R	A W	G E I	C IG	FH	T	М	A I	IN N	P	R O	TC KU	O D	RS		EL	A	D	Ξ				
	14 28	-	EI	.C	O A	FD	I	L W	E El	D G	R H	A T	G	C E N	F	₽	M O	A U	IN ND	S	R	OT	0	R		EL	A	D)	E				
ХX	14 29	-	H	R	0 E	FL	Ï	L W	E El	DG	R H	A T	G	C E N	F	P	M O	A U	IN ND	S	R	OT	0	R		EL	A	D	Ξ				
	14 30	-	HY	PR I A	0	FI	I' M	LU	EM	DG	R R	A O	GSS	5	) F W	E	N I	A Gl	IN HT		R I	OT N	0 P	R O	IJ	EL ND	AS	D.	E				

Profile Drag of Tail Rotor Blade Pairings

ХХ	15 16	-	PROFILE DRAG OF TAIL ROTOR ELADE DISC LOADING OF THE MAIN ROTOR SYSTEM
XX	15 17	-	PROFILE DRAG CF TAIL ROTOR ELADE WIDTH OF THE FUSELAGE IN FEET
	15 18	-	PROFILE DRAG OF TAIL ROTOR ELADE LENGTH OF THE FUSELAGE IN FEET
ХХ	15 19	-	PROFILE DRAG CF TAIL ROTOR ELADE FRONTAL FLAT PLATE AREA IN SQUARE FEET
ХХ	15 20	-	PROFILE DRAG OF TAIL ROTOR ELADE VERTICAL FLAT PLATE AREA IN SQUARE FEE
	15 21	-	PROFILE DRAG OF TAIL ROTOR ELADE MAXIMUM VELOCITY IN KNOTS
XX	15 22		PROFILE DRAG OF TAIL ROTOR ELADE MAXIMUM RANGE IN NAUTICAL MILES
	15 23	-	PROFILE DRAG OF TAIL ROTOR ELADE RATE OF CLIME IN FEET PER MINUTE, MAXIMUM CONTINUCUS POWER
	15 24		PROFILE DRAG OF TAIL ROTOR ELADE HOVER CEILING (IN GROUND EFFECT) IN FEET
	15 25	-	PROFILE DRAG OF TAIL ROTOR ELADE HOVER CEILING (CUT OF GROUND EFFECT) IN FEET
	15 26	-	PROFILE DRAG OF TAIL ROTOR ELADE LENGTH OF THE TAILBOOM IN FEET
	15 27	-	PROFILE DRAG OF TAIL ROTOR ELADE OPERATING WEIGHT IN POUNDS
	15 28	-	PROFILE DRAG OF TAIL ROTOR ELADE LOAD WEIGHT IN POUNDS
XX	15 29	-	PROFILE DRAG CF TAIL ROTOR ELADE FUEL WEIGHT IN POUNDS
	15 30	-	PROFILE DRAG OF TAIL ROTOR ELADE MAXIMUM GRCSS WEIGHT IN POUNDS

	Disc		Loadin		ing of			f the			Main			Rc	ot	01	•	S	Y :	st	e	ł	Pa	i	ing	4
	16 17	-	DIS WID	C TH	LC C	A D F	I I T E	N G H E	C F	FUS	TE	H H L A	E IG	ME	A :	IN IN		R ( F 1	DT E E	O I T	<b>.</b>	SY	S	ΓΞ	М	
	16 18	-	DIS LEN	C G T	LO. H	A D O F	IÌ	NG IH	E C	F FU	T JS	HH EI	E	M G	A I E	IN I	N	R ( I	DI E	OH E 1	R I	SΥ	S	ΙE	М	
	16 19	-	DIS FRO	C NT	LC AL	A D F	II L <i>i</i>	NG A I	O P	FLA	T T	HE E	E A	i1 R [	A I E J	IN A	I	R ( N	D I S		R J A	S Y R E	S	I E F E	M ET	
	16 20	-	DIS VER	C TI	LO CA	A D L	IN Fl	N G L A	т	F Pl	T A	HI TI	5161	M A	A I R I	IN EA		R ( I 1	DT N	0i S(	2 U	S Y A R	SE	ΓE F	M EET	
	16 21	-	DIS MAX	C IM	LC UM	A D V	II Ej	N G L C	cI	F TY	T	HI IN	2	M K	A I N (	IN DI	S	R(	DT	01	R	SY	S	ΤΞ	М	
	16 22	-	DIS MAX	C I M	LO U M	A D R	I N A N	N G N G	г <sup>О</sup>	FIN	T	H H N A	E AU	M T	A I I (	IN CA	L	R (	IC IK		R ES	SY	S	ΤE	М	
	16 23	-	DIS RAT MAX	C E I M	LO OF UM	A D C C		I G I M N T	0 B I N	F IN UC	T I U	HE FE S	EEP	Н Т О	A I I W I	IN PE ER	R	R ( l	II 1	O I N I	R UT	SY E,	S	ΤΞ	М	
	16 24	-	DIS HOV IN	C ER FE	LO C ET	A D E I	IÌ	IG IN	G	F (I	T N	HI	ER	M 0	A I U I	IN ND		R ( E J	DT F F	OI EC	R C T	SY )	S	ΤE	М	
XX	16 25	-	DIS HOV IN	C ER FE	LO C EI	λD ΞI	IÌ LI	NG IN	G	F (0	T U	HI T	<sup>2</sup> 0	M. F	A :	IN GR	0	R Q U I	D N	0]	R E F	S Y F E	s C	ΤΕ Τ)	М	
XX	16 26	-	DIS LEN	C G T	LO H	A D O F	IÌ	N G I H	о Е	FIA	Ť	HI LE	30	М . О .	A I M	IN I	N	R (	DT F E	01 E	R T	SY	S	ΤE	М	
XX	16 27		DIS OPE	C RA	LC II	A D NG	II	N G W E	0 IG	F HI	T	HI IN	Ē	M P	A I O I	IN UN	D	R ( S	DI	01	R	SY	S	ΤĒ	M	
XX	16 28	-	DIS LOA	C D	LO WE	A D I G	Il H (	NG I	0 IN	F	T O	H H U I	E ND	M S	A I	IN		R(	TC	01	R	SY	S	ΤE	M	
XX	16 29	-	DIS FUE	C L	LC WE	A D I G	I I H 1	N G I	C I N	F	T C	HIUI	E ND	И S	A :	IN		E	DI	01	R	SY	S	ΤE	M	
	16 30	-	DIS MAX	C IM	LO UM	A D G	I) R(	NG SS	s <sup>0</sup>	FWE	TI	HI GI	E HT	M	A I	IN N	P	R ( O I	L C N U	D	R S	SY	S	ΤE	M	

Width of the Fuselage Pairings

	17 18	-	WII LEN	D T H V G I	H H	C F O	י דו ו	ΤĘ	H E I H	ΪE	F	US FU	E	L) E	AG LA	E G	E	IN I	N	F	E E E	ΞĒ	Τ						
	17 19	-	WII FRC	D T F D N T	I I A	CF L	F	T I L I	H F A I		F 2	US I/	5 E A T	L. E	AG A	E R	E	IN A	I	F N	EH	ET SQ	U	A R	Ε	]	FE	ΕE	T
	17 20	-	V II V E S	D T E R T J	I C	OF AL	,	T H F I	H E L A	T	Ē	US PI	E A	L) T	AG E	E A	R	IN EA		F I	E E N	ET S	Q	JA	R	E	E	Ξ	Eľ
	17 21	-	WII MAX	TTC T	H 1 U	CF M	v	T I E I	H H L C	E C	FI	US TY	Ε	L I	AG N	E K	N	IN OT	S	F	ΕI	ΞT							
CX	17 22	-	WII MA 2	D T E K I Y	H H U	OF M	R	T H A I	H E N C	E	F	US IN	5E I	LI N.	AG AU	E T	I	IN CA	L	F	E E M ]	ET [L	E	S					
	17 23	-	WII RAT MAD	DTE EE KIN	H O I U	OF F M	CC			ів III	F N	US IN UC	E	Li Fi S	AG EE P	ETO	Ŵ	IN PE ER	R	F	E E MI	ET N	U	ΤΞ	,				
	1 <b>7</b> 24	-	N II HOV I N	OTH 7 EH FH	H ? E E	OF CE T	I	T H L	H E I N	G	F	US (1	EN	L	AG GR	E O	IJ	IN ND		F E	E E F E	ΞĒ	С	T)					
	17 25	-	WII HOV IN	OTE IEE FE	H { E E	CF CE T	I	T H L I	H E I N	iG	F	US ((	E U	L. T	AG O	E F		IN GR	0	F U	E E N I	ΞT	E	FF	Ξ	C	I)		
	17 26	-	WII LEN	D T H N G 1	H H	70 0	Ē	ΤĮ	H E I E	: I E	۲IJ	US TA	EI	L. Li	AG BO	EO	М	IN I	N	F	E F	ET EE	Ŧ						
	17 27	-	WII OPI	D T H E R A	H A T	CF IN	, IG	I T	HE	E I	F G	05 H1	E	L. II	AG N	EP	0	IN UN	D	F S	ΕI	ΞT							
	17 28	-	WII LOZ	D T H A D	H W	OF EI	G	TH H 1	H E I	I	F N	US E	ΞO	L U	AG ND	FIS		IN		F	EB	ΕT							
	17 29	-	WII FUI	DTH EL	I W	CF EI	G	TI H 1	H E F	I	F N	US E	5 E C	I. U	AG ND	E S		IN		F	ΞI	ΞT							
	17 30	-	WI MAX		i 1 U	O F M	G	T I R (	HE	: SS	F		5E EI	L. Gi	AG HT	Е	I	IN N	P	F C	E E U N	ET ID	S						
Length of Fuselage Pairings

18 19	-	LEN FRO	GT NT	H C AL	)F FL	T A	H E I	P	FU LA	ST	ELA E A	GR	E E i	AI	NI	N ]	FI	E E SQ	T U	A F	E	I	ΞE	ΕT
18 20	-	LEN VER	GT TI	H ( CAI	)F F	TL	H E A I		FU FL	S A	ELA TE	G À	E R I	I EA	N	I	e : N	EE S	T Q	U 3	R	E	F	EEI
18 21	-	LEN MAX	GT IM	H C UM	)F VE	I L	H E O C	Ī	FU IY	S	ELA IN	G K	E N (	I TC	N S	J	EI	ΕE	Т					
18 22	-	LEN MAX	GT IM	H C U M U	)F RA	TN	HI GI		FU IN	S	E LA N AU	G	E I (	I CA	NL		E I M I	EE IL	T E	S				
18 23	-	LEN RAT MAX	GT E I M	H C CF UM	CL CC	T I N	H E M E T I	E B E N	FU IN UO	S	ELA FEE S P	GTO	E W J	I PE ER	N R		E I Mi	EE IN	T U	TE				
18 24	-	LEN HOV IN	GT ER FE	H C CH ET	)F EIL	TI	H H N G		FU (I	S N	ELA GR	G O	E U I	I D	Ν	E	F I	EE FE	TC	T)				
18 25	-	LEN HOV IN	GT ER FE	H C CI ET	)F EIL	TI	H H N G	[.].	FU (C	ទ	ELA T O	G F	E (	I GR	N O	U	F I N I	EE D	T E	FI	Έ	C	F)	
18 26	-	LEN LEN	GT GT	H C H C	)F )F	T I	H H H H		FU IA	SI	ELA LBO	G	E M	I	N N		E J	EE EE	T T					
18 27	-	LEN OPE	GT RA	H ( TIN	DF IG	TW	HH E J	E I G	F U HT	S	ELA IN	G	E Ol	І И U	N D	S	F	ΕE	T					
18 28	-	LEN LOA	G T D	H ( WE]	)F IGH	T	H H I	- N	FU P	S 0	ELA UND	G S	E	I	N		FI	ΕE	-					
18 29	-	LEN FUE	G T L	H ( WE]	)F IGH	T	HI	E N	F U P	S	ELA UND	GS	E	I	N		E I	ΕE	Τ					
18 30	-	LEN MAX	GT IM	H C UM	)F GR	TO	H H S S		FU WE	SI	ELA GHT	G	E I i	I	N P	0		EEND	TS					

ХХ

Frontal Horizontal Flat Plate Area Pairings

	19 20	-	FRO VER	NT TI	AI CAL	F I F	À	T A T	2	LA PL	T A	Ī Ī E	A H A	R E A R	A E A	INI	I N	SÇ	U Q	A R U A	E R I	F	테너	ET EE	Ţ
	19 21	-	FRO MA X	NT I M	AL UM	FI VE	A	I CC	P	I A I Y	T	E IN	A I F	R E K N	A OT	IN S	I	SQ	U	AR	E	F	Ē	ΕT	
	19 22	-	FRO MAX	NT IM	AL UM	FI RA	A N	T GE	P	LA IN	T	E N A	A E U I	RE	A CA	IN L	I M	SC II	UE	A R S	E	F	Έ	ΕT	
ХХ	19 23	-	F KO RAT MAX	NT Ē IM	AL OF UM	FI CI CC	A I N	T MB TI	PN	LA IN UO	T U	E FE S	A E E P C	R E D W	A PE ER	IN R	M	SQ IN	U U	AR TE	E ,	F	E	ET	
ХХ	19 24	-	FRO HOV IN	NT ER FZ	AL CE ET	FI	A I I	I NG	P	LA (I	T N	E G	A F R C	R E DU	A ND	IN	I E F	SQ F F	U C	AR T)	E	F	Έ	ΕT	
ХХ	19 25	-	FRO HOV IN	NT ER FE	AL CE ET	FI II	A I I	T NG	P	LA (C	T U'	E	A H O H	ŖΕ	A GR	IN OU	I	SQ L	U E	AR FF	E EC	F	'E ')	ĒΤ	
XX	19 26	-	F RO LEN	NT GT	AI H C	F I F	. A T	T HE	P	LA TA	T I	E LB	A E O C	R E D M	AI	IN N	I F	SQ E E	U T	AR	E	F	Έ	ΞT	
	19 27	-	FRO OPE	N T R A	AL TIN	FI G	. A W	T E I	2 .G	LA HT	Τ	E IN	A E	R E P O	A UN	IN DS	1	SÇ	U	AR	E	F	E	ΕT	
	19 28	-	FRO LOA	NT D	AL WEI	FI GH	. A I T	TI	P N	IA P	T C	E U N	A E D S	R E S	A	IN	1	SÇ	U	AR	E	F	E	ΕT	
XX	19 29	-	FRO FUE	NT L	AL WEI	F I G H	A I T	Ί	PN	LA P	ТО	E NU	A E D S	R E	A	IN	T	SQ	U	AR	E	F	E	ΞT	
	19 30	-	FRO MAX	TN EI	A L U M	F I G F	. A 2 O	I SS	5	L'A WE	T I	E GH	A E	RE	A N	IN PC	រ	SQ ND	US	AR	E	F	Έ	ΕT	

# Prontal Vertical Flat Plate Area Pairings

XX	20 21	-	V E MA	IR X	T I I I	I ( M C	C A J N	AL 1	V	FE	L	A C	T CI	E I	Y Y	A	TH	E N	A K	R N	EX O1	A I S	I	N		S	2 t	J	R	E	Ē	Ξ	ΞI	-
XX	20 22	-	V E M A	R	TI	I ( M I		IL 1	R	F A	L N	A G	T E	FI	N N	A	TN	E AU	A T	RI	EI CI	A A L	I	N M	I	S	QI Ē	J <i>I</i> S	AR	E	F	[E]	Ξl	-
	20 23	-	VE RA MA	R T X	TI E I	) I (  }			CC	F L O	L I N	A M T	T B IN	E I I U	L N JO	A U	T F S	E E P	A T O	R W	EDE	A E R R	I	N M	Ī	S	ן ה ניני	UA Fl	AR E,	E	F	Ē	Εl	
	20 24	+	VE HC IN	IR V I	TI EI FI	I ( R E :			I	FL	LI	A N	T G	E	[] []	A N	T	E GR	A O	R U	E. NI	A D	IE	N F	F	S E		U/ I)	AR	E	F	E	El	
	20 25	-	VE HC IN	RV	TEI F				I	FL	L I	A N	T G	E (	L (C	A U	Ţ Ţ	E O	A F	R	E. GI	A R C	IJ	N N	Ľ	S	Q i Ē i	U2 F1	A R F E	E CI	F )	E	ΕΊ	7
ХХ	20 26	-	VELE	R N	T G	I ( T I	C A H	A L O	Ē	F	I T	A H	T E	E T	L A	A I	T L	E BO	А О	R M	E	A I N	I	N F	E	S E'	Q I I	U I	AR	E	P.d	E	El	C
	20 27	-	V E O P	RE	T E	I ( A '		AL IN	G	Ē	L ท	A E	T IG	E	L	A	T I	E N	A P	R C	EI Ul	A V D	I S	N	:	S	Q	J	AR	E	F	E	ΞJ	C
	20 28	-	VE LC	R	T: D	I ( I	C A W E	L EI	G	F H	L T	A	T I N	E	Ŀ	A O	Ţ	E ND	A S	R	Ē.	A	I	N		S	QI	U	A R	Ε	F	E	Ξl	C
XX	20 29	-	V E F U	IR IE	T I L	I	C A W I		G	F H	L T	A	T IN	E	P	A G	T U	E ND	A S	R	EJ	A	I	N		S	QI	J	AR	Ē	F	Ξ	El	C
	20 30	-	V E M A	RX	T I	I ( M (		AL 1	G	F R	L C	A S	TS	E	I. I.E.	AI	ŤĜ	E HT	A	RI	E. N	A F	I	N U	N	S D	) Š	U	A R	E	F	E	ΞJ	C

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Maximum Forward Velocity Pairings

	21 22	-	× 1 × 1	1A 1A	X X	I I	M M	U	M M	V R	Ξ A	L N	O G	C I	I	I) I)	Z	I N	N AU	K T	N I	OT CA	SL		M	IL	E.	S		
	2 <b>1</b> 23	-		1A ? A 1A	X T X	I E I	M M	0 0 0	M F M	V C C	E L O	L I N	0 M T	C B I	I' N	TI Il U(	20 4 7	I F S	N EE P	K T O	N W	OT PE ER	S R		M	IN	U	TE	*	
	21 24	-	l H J	1A 10 1 N	V	I E F	MRE	U E	M CE I	V I	E L	L I	O N	C I G	I	T ] (-	Z E N	I	N GR	K O	N U	OT ND	S	E	F	FΕ	С	T)		
	21 25	-		1A 10 1 N	X V	I E F	М R E	U E	M CE T	V I	L E	I I	O N	C : G	ľ	I ] ()	r C U	I I	N O	K F	N	OT GR	S 0	U	N	D	E	FF	٤J	СТ
XX	21 26	-	l I		X	I G	M T	U H	MO	V F	E	L T	O H	C. E	I	T T	Y A I	I L	N BO	K O	N M	IO I	SN		F	ΕE	Τ			
	21 27	-	Č	1A DP	Æ	I R	M A	U T	M IN	₩ G	Ε	IW	C E	C I	IG	T I H'	ľ	I I	N N	K P	N O	OT UN	S	S						
	21 28	-	I		À	I D	M	U W	M EI	V G	E H	L T	0	C I	I N	T ]	Y PC	IJ	N ND	K S	N	ΟI	S							
ХХ	21 29	-	1	MA FU	X E	IL	M	U ₩	M EI	₹ G	E H	I T	С	CI	IN	T	Y P C	I U	N ND	KS	N	ΓO	S							
	21 30	-	i l	1A 1A	X	I	M M	ប ប	M M	V G	ER	L C	0 S	C S	I	I W	Y E I	IG	N HT	K	N I	O I N	:S P	0	U	ND	S			

# TABLE 26

# Maximum Range Pairings

	22 23	-	5:0423	A A	X T X	I I I I	M M	U 0 U	M F M	R A C I C C	N N L I N N	GMT	E B IN	1	IN IN UC	U	N A F I S	AU EE P	TIO	I R	CA PE ER	L R	M	II IN	រីប	S TI	Ξ,		
XX	22 24	-	M H I	A O N	X V	I E F	M R E	U E	M CE T	RA II	N L I	G N	EG		IN (I	N	N I C	AU GR	T Oi	IJ	CA ND	L I	M E F	II Fl	E E C	S T)			
ХХ	22 25	-	L H I	IA O N	X V	I E F	M R E	U E	M CE T	RA I I	I N I N	I G N	E G		IN (C	ប	N A T	0 70	T F	I	CA GR	L Ot	M J N	II C	EIFI	S F I	F 2	C	Г
XX	22 26		M L	IA E	X N	I G	M T	U H	M 0	RI F	N N T	I G H	E		IN TA	I	N A L E	U A BO	T O	I M	CA I	L N	M F	II EI	E E T	S			
	22 27	-	ð C	P	X E	I R	M A	U T	M IN	RA G	N W	I G I E	EIC	3	IN HT		N/ IN	4 4 U	T : P (	I O	CA UN	L D S	М 5	II	5	S			
	22 28	-	ľ I	1À .0	X A	ID	Μ	U W	M EI	R <i>I</i> Gi	N N F T	G	E Il	N	IN P	0	N / U 1	AU ND	T S	I	CA	L	М	II	ΞE	S			
	22 29	-	E	IA U	XE	I L	Ч	U W	M EI	R A G r	N N H T	G	EIN	Ñ	IN P	0	N I U I	AU ND	T. S	Ι	CA	L	M	II	ΞE	S			
	22 30	-	21.25	IA I A	X X	I	M M	U U	M M	R# G S	A N R C	GS	ES		IN We	I	N I GI	U A H T	T.	I I	CA N	L P(	M D U	II NI	) E DS	S			

#### Rate of Climb Pairings

23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUOUS POWER
24 - HOVER CEILING (IN GROUND EFFECT) IN FEET
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
25 - HOVER CEILING (CUT OF GROUNL EFFECT) IN FEET
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
26 - LENGTH OF THE TAILBOOM IN FEET
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUOUS POWER
26 - LENGTH OF THE TAILBOOM IN FEET
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUOUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUOUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
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23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE MAXIMUM CONTINUCUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE
23 - RATE OF CLIMB IN FEET PER MINUTE
MAXIMUM CONTINUCUS POWER
23 - RATE OF CLIMB IN FEET PER MINUTE

#### TABLE 28

Hover Ceiling (IGE) Pairings

	24	-	HOVER CEILING (IN GROUND EFFECT)
	25	-	HOVER CEILING (CUT OF GROUNE EFFECT) IN FEET
XX	24	-	HOVER CEILING (IN GROUND EFFECT)
	26	-	LENGTH OF THE TAILBOOM IN FEET
	24	-	HOVER CEILING (IN GROUND EFFECT)
	27	-	OPERĂTING WEIGHT IN POUNDS
	24	-	HOVER CEILING (IN GROUND EFFECT)
	28	-	LOAD WEIGHT IN POUNDS
XX	24	-	HOVER CEILING (IN GROUND EFFECT)
	29	-	FUEL WEIGHT IN POUNDS
	24	-	HOVER CEILING (IN GROUND EFFECT)
	30	-	MAXIMUM GROSS WEIGHT IN POUNDS

Hover Ceiling (OGE) Pairings

ХX	25	-	HOVER CEILING (CUT OF GROUNE EFFECT)
	26	-	LENGTH OF THE TAILBOOM IN FEET
	25	-	HOVER CEILING (CUT OF GROUND EFFECT)
	27	-	ÖPERÄTING WEIGHT IN POUNDS
	25	-	HOVER CEILING (CUT OF GROUND EFFECT)
	28	-	LÖAD WEIGHT IN POUNDS
ХХ	25	-	HOVER CEILING (CUT OF GROUND EFFECT)
	29	-	FÜEL WEIGHT IN POUNDS
	25	-	HOVER CEILING (CUT OF GROUND EFFECT)
	30	-	MĂXIMUM GRCSS WEIGHT IN POUNDS

# TABLE 30

# Length of Tail Pairings

	26 27	-	LEN OPER	GT RA 1	H ( TI	OF NG	T W	HE E I	G	IA ET	I	LBO IN	O M P C		EN NDS	FEET	
	26 28	-	LENC LOAI	GT.	H ( WE:	OF IGi	T I I	HE I	N	TA P	I O	LBO UND	0 M S		EN	FEET	
XX	26 29	-	LENG FUE	G T (	H WE	OF IGH	T I T	HE I	N	IA P	I C	LBO UND	00 S	1 ]	E N	FEET	
	26 30	-	LEN C MAXI	G T E M	H ( UM	OF GE	I SO	HE SS		TA WE	I I	LBO GHT	0 M		E N PO	FEET	

Operating Weight Pairings

- 27 OPERATING WEIGHT IN POUNDS 28 LOAD WEIGHT IN POUNDS
- 27 OPERATING WEIGHT IN POUNDS 29 FUEL WEIGHT IN POUNDS
- 27 OPERATING WEIGHT IN POUNDS 30 MAXIMUM GRCSS WEIGHT IN POUNDS

TABLE 32 Load Weight Pairings

28 - LOAD WEIGHT IN POUNDS 29 - FUEL WEIGHT IN POUNDS 28 - LOAD WEIGHT IN POUNDS 30 - MAXIMUM GRCSS WEIGHT IN POUNDS

TABLE 33

Fuel Weight Pairings

29 - FUEL WEIGHT IN POUNDS 30 - MAXIMUM GROSS WEIGHT IN POUNDS

# APPENDIX C

DATA POINT PLOTS, CURVE FITS, AND CURVE FIT EQUATIONS

Main Rotor Radius Pairings.





Fig. 1-2a and 1-2b.



Fig. 1-3a and 1-3b.



Fig. 1-4 and 1-5.



Fig. 1-6a and 1-6b.



Fig. 1-7a and 1-7b.



Pig. 1-8.

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Fig. 1-9a and 1-9b.



Fig. 1-10a and 1-10b.



Fig. 1-11a and 1-11b.



Fig. 1 - 12 and 1 - 14.



Fig. 1-16a and 1-16b.



32



Fig. 1-18a and 1-18b.



Fig. 1-19a and 1-19b.



Fig. 1-20 and 1-21.



Fig. 1-22 and 1-23.



Fig. 1-24 and 1-25.

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Fig. 1-26a and 1-26b.



Fig. 1-27a and 1-27b.



Fig. 1-28a and 1-23b.



Fig. 1-29a and 1-29b.



Fig. 1-30a and 1-30b.

Tail Rotor Radius Pairings.





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Fig. 2-4.



Fig. 2-7a and 2-7b.



Fig. 2-9a and 2-9b.


Fig. 2-11a and 2-11b.



Fig. 2-13 and 2-15.



Fig. 2-16a and 2-16b.







Fig. 2-24 and 2-25.



Fig. 2-26a and 2-20b.



Fig. 2-27a and 2-27b.



Fig. 2-28a and 2-28b.



Fig. 2-30a and 2-30b.

Number of Main Rotor Blades Pairings.





Fig. 3-4a and 3-4b.



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Fig. 3-5.



Fig. 3-6a and 3-6p.



Fig. 3-7a and 3-7b.





Fig. 3-10a and 3-10b.



Fig. 3-12 and 3-14.

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Fig. 3-16a and 3-16b.



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Fig. 3-18a and 3-18b.



Fig. 3-19a and 3-19b.



Fig. 3-21 and 3-22.



Fig. 3-23 and 3-24.







Fig. 3-27a and 3-27b.



Fig. 3-28a and 3-28b.





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Fig. 3-30a and 3-30b.









Fig. 4-7 and 4-9.



Fig. 4 - 11 and 4 - 13.



Fig. 4 - 15 and 4 - 18.



Fig. 4-21 and 4-24.






Fig. 4-26a and 4-26b.





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Fig. 4-29 and 4-30.

Height of Main Rotor System Pairings.

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Fig. 5-6a and 5-6b.



Fig. 5-8 and 5-14.



Fig. 5-16 and 5-17.







Fig. 5-19a and 5-19b.





Fig. 5-23 and 5-24.



Fig. 5-25.



Fig. 5-26a and 5-26b.



Fig. 5-27a and 5-27b.



Fig. 5-28.



Fig. 5-30a and 5-30b.







Fig. 6-7a and 6-7b.



Fig. 6-8.



Fig. 6-10a and 6-10b.



Fig. 6 - 12 and 6 - 14.



Fig. 6-16a and 6-16b.



Fig. 6-18a and 6-18b.



Fig. 6-19a and 6-19b.



Fig. 6-20 and 6-21.



Fig. 6-23 and 6-24.



REPRODUCED AT GOVERNMENT EXPE



Fig. 6-27a and 6-27b.



Fig. 6-28a and 6-23b.



Fig. 6-30a and 6-30b.



Speed of Tail Rotor Radius Pairings.















Fig. 7-9a and 7-9b.


Fig. 7 - 11 and 7 - 13.



Fig. 7-15.



Fig. 7-16a and 7-16b.



Fig. 7-19a and 7-19b.







Fig. 7-25.



Fig. 7-26a and 7-26b.



Fig. 7-27a and 7-27b.



Fig. 7-28a and 7-28b.



Fig. 7-30a and 7-30b.



Chord of Main Rotor Blade Pairings.

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182



Fig. 8-9a and 8-9b.



Fig. 8-10 and 8-12.



Fig. 8 - 14 and 8 - 16.







Fig. 8-20 and 8-21.







Fig. 8-26 and 8-27.



Fig. 8-28 and 8-30.







Fig. 9-11a and 9-11b.



Fig. 9-13 and 9-15.



Fig. 9-21 and 9-22.



Fig. 9-24 and 9-25.



Fig. 9-26a and 9-26b.



Fig. 9-27a and 9-27b.



Fig. 9-28.



Fig. 9-30a and 9-30b.

Span of Main Rotor Pairings.

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Fig. 10 - 11 and 10 - 12.



Fig. 10-14 and 10-16.





Fig. 10-18a and 10-18b.


Fig. 10 - 19 and 10 - 20.



Fig. 10-21 and 10-23.



Fig. 10-24 and 10-25.



Fig. 10-26a and 10-26b.



Fig. 10-27a and 10-27b.



REPRODUCED AT GOVERNMENT EXPENSE

Fig. 10-28.



Fig. 10-30a and 10-30b.

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Span of Tail Rotor Pairings.





Fig. 11-12 and 11-13.



Fig. 11-15.



Fig. 11-19a and 11-19b.



Fig. 11-20 and 11-21.



Fig. 11-24 and 11-25.



Fig. 11-26a and 11-26b.



Fig. 11-27a and 11-27b.



Fig. 11-28a and 11-28b.



Fig. 11-30a and 11-30b.

Twist of Main Rotor Blade Pairings.





<u>د</u>

8. CH-648 7. CH-630 8. CH-63E 9. AH-15 10. UH-1H

Fig. 12-13 and 12-14.

229



Fig. 12-16 and 12-21.

Twist of Tail Rotor Blade Pairings.





Fig. 13-15 and 13-30.

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Profile Drag of Main Rotor Blade Pairings.





Fig. 14-15 and 14-16.



Fig. 14-21 and 14-23.

258

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Fig. 14-24 and 14-25.

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Fig. 14-27 and 14-28.



Pig. 14-30.
Profile Drag of Tail Rotor Blade Pairings.

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Fig. 15-18 and 15-21.



Fig. 15-23 and 15-24.



Fig. 15-25 and 15-26.



Fig. 15-27.



Fig. 15-28a and 15-28b.



REPRODUCED AT GOVERNMENT EXPENSE

250

Disc Loading of the Main Rotor System Pairings.

252

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Fig. 16-19a and 16-19b.



Fig. 16-20 and 16-21.





Fig. 16-22 and 16-23.



Fig. 16-24 and 16-25.



Fig. 16-26a and 16-26b.



Fig. 16-27a and 1b-27b.





Fig. 16-30a and 16-30b.

202

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Width of the Fuselage Pairings.

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Fig. 17-18 and 17-19.



Fig. 17-20 and 17-21.



Fig. 17-23 and 17-24.



Fig. 17-25 and 17-26.



Fig. 17-27 and 17-28.



Fig. 17-29 and 17-30.







Fig. 18-19a and 18-19b.



Fig. 18-20 and 18-21.



Fig. 18-22 and 18-23.



Fig. 18-24 and 18-25.



Fig. 18-26a and 18-26b.





Fig. 18-27a and 18-27b.


Fig. 18-28a and 18-28b.



Fig. 18-30a and 18-30b.

Frontal Horizontal Flat Plate Area Pairings.

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Fig. 19-20 and 19-21.



350 -

(MN) SEDNAR MUMIXAM

400 -

300-

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600-

460-

200-

250-





Fig. 19-27a and 19-27b.



Fig. 19-28a and 19-28b.



Fig. 19-30a and 19-30b.



Frontal Vertical Flat Plate Area Pairings.

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Fig. 20-23 and 20-24.



Fig. 20-25 and 20-27.



Fig. 20-28 and 20-30.



Maximum Forward Velocity Pairings.

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Fig. 21-22 and 21-23.



Fig. 21-24 and 21-25.



Fig. 21-27 and 21-28.



Maximum Range Pairings.

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Fig. 22-23 and 22-27.



Rate of Climb Pairings.





Fig. 22-28 and 22-29.



Fig. 23-24 and 23-25.



Fig. 23-26 and 23-27.



Fig. 23-28 and 23-29.



Fig. 23-30.






Fig. 24-25 and 24-27.



Fig. 24-28 and 24-30.







Fig. 25-27 and 25-28.



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Fig. 25-30.

Length of Tail Pairings.





Fig. 26-27a and 26-27b.



Fig. 26-28a and 26-28b.



Fig. 20-30a and 26-30b.



Operating Weight Pairings.





Fig. 27-28a and 27-28b.



Fig. 27-29a and 27-29b.



Fig. 27-30a and 27-30b.



Load Weight Pairings.

334

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Fig. 28-29a and 28-29b.



Fig. 28-30a and 28-30b.

Fuel Weight Pairings.



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Fig. 29-30a and 29-30b.









## <u>APPENDIX</u> D

## FORTRAN AND HEWLETT PACKARD COMPUTER PROGRAMS

## A. 'CRVFIT' (DETERMINATION OF CURVE FIT EQUATIONS) HP PROGRAM

This program will determine a curve of best fit to a set of data points. The four standard curve types the program handles are:

Linear y = b\*x + a

1.

- 2. Exponential  $y = a^{\pm}e^{DX}$  (a>0)
- 3. Logarithmic  $y = b^{\pm}Ln(x) + a$
- 4. Power  $y = a^{a}x^{D}$  (a>0)

The program will compute the coefficients a and b in the equation of one of the above four curve types

as well as compute a value  $r^2$  called the coefficient of determination which is a measure of the goodness of fit. Once a set of data has been fit to a given curve type, a prediction may be made for the y-value given a new x-value, or a prediction may be made for the x-value given a new y-value. The functions available on the top row of keys on the keyboard are indicated in the following diagram.



These same functions are referenced in the examples and instructions by enclosing the name of the function on the key in square brackets [].

Example 1: Find the straight line which best fits the tollowing data: (1.1, 5.2), (4.5, 12.6), (8.0, 20.0), (10.0, 23.0), (15.6, 34.0) Then predict y when x=20 and predict x when y=25.

LOAD "CVF" PROF. Into the 41C and SIZE 027. GTO "CVF" and go into USER mode. This puts the program counter in ROM and makes the curve fit functions available on the top row of keys. Pressing [INITIALIZE] will initialize the program. This clears registers R11 thru R24 so that a new set of data may be entered. In this example the 5 data points will be entered using the [ $\Sigma$ +] key. Key in each pair as x ENTERT y and push [ $\Sigma$ +].

Do:	

See:

EINITIALIZE	:]		1.0000
1.1 ENTER	5.2	[Σ+]	2.0000
4.5 ENTER	12.6	[Σ+]	3.0000
8.0 ENTER	20.0	[Σ+]	4.0000
10.0 ENTER	23.0	[Σ+]	5.0000
15.6 ENTER	34.0	[Σ+]	6.0000

All the data has now been entered and the parameters for the curve will be computed next. Since in this example we are interested in a straight line we key 1 (j=1) and push [SOLVE TYPE J]. When execution stops the values a, b, and r are available in the stack as:

Z:	r	and	ar e	also	stored	as	R08:	b
Y1	8						R09:	a
X:	b						R10:	r

For this example:

Z: r=0.999035140. Y: a=3.499147270 X: b=1.972047542

The value r ranges between -1 and +1 and is a measure of how well the data fits the given curve type. The sign of r indicates whether the data is positively or negatively skewed. The closer r is to one of the extremes  $\pm 1$  the better the fit. For this example the line has positive slope and the fit is extremely good (all sample problems seem to work well).

Having computed the values b and a (these remain stored in R08 & R09 until new data is input) we can determine new points along the line. Key in 20 and push [ $\hat{y}$ ] for the predicted y-value. y=42.94009811 when x=20. Key in 25 and push [ $\hat{x}$ ] for the predicted x-value. x=10.90280649 when y=25.

## COMPLETE INSTRUCTIONS FOR "CVF"

(Keyboard Operation)

1) Key GTO ", SIZE 027 and go into USER mode. The keyboard functions should now be now available on the top row of keys.

2) Press [INITIALIZE] to Initialize the program. This step clears data registers R11 thru R24 Inclusive. These registers will be used to accumulate the data for all four curve types. The display will show 1. 3) Key in the next data pair (x,y) as  $x \ ENTER1$  y and push  $[\Sigma +]$ . Repeat this step for all data pairs. The display will stop with a count of the number of the next data pair to be entered. This feature makes it possible to enter only the y-values when the x-values are consecutive integers which start counting from 1. In this case the display provides the x-values which need not be entered. The improper data pair has just been input with the  $[\Sigma +]$  key, then immediately pressing R/S will delete the pair. Otherwise an improper or undesired data pair can be deleted by re-entering both x and y and pressing  $[\Sigma -]$ .

4) As data pairs are entered it is possible that some x or y value is negative or zero. In these cases only one or two of the four curve types may be applied to the data. The four curve types and their respective equations are as follows:

Type J	Name	Equation
1	Linear	$y = b^*x + a$
2	Exponential	$y = a^* e^{bx}$ (a>0)
3	Logarlthmlc	$y = b^{\pm}Ln(x) + a$
4	Power -	$y = a^* x^b  (a>0)$

If any x-values are negative or zero then only types 1 & 2 are teasible curves. If any y-values are negative or zero then only types 1 & 3 are teasible curves. If in any data pair both x and y are negative or zero then type 1 is the only feasible curve. The a coefficient must be positive for curve types 2 and 4.

5) After all data pairs have been input the next step is to select the desired curve type. This step can be accomplished in one of two ways. Under either option, the 41C should not be interrupted or else there is a possibility that the data registers will not be returned with their normal contents.

a) To fit a particular curve type, key in the number 1-4 for that type and press [SOLVE TYPE j]. The stack returns with:

Z: r and these parameters R07: J=curve type Y: a remain stored in R08: b X: b R09: a R10: r

Step a) may be repeated at any time for any of the four curve types.

b) If all data input is positive then pressing [SOLVE BEST] will automatically choose the curve of best fit according to the curve type with largest absolute value of r. In this case the stack returns with:

Tr	r and the	ese parameters	R07:	J≡curve	type
Z:	a remain	stored In	R08:	b	
Y:	Ь		R09:	a	
X:	J=best curve	type	R10:	r	

6) Predictions for new x or y values may be made only after step 5) has been completed. Predictions for new values are based on the settings of flags FO8 and FO9 which are automatically set during the fit process in step 5). The status of flags 8 and 9 for the four curve types are as follows.

Elan B Elan O

		i lag o	
1	Linear	clear	clear
2	Exponential	set	clear
3	Logarlthmic	clear	set
4	Power	set	set

4

In general the user need not be concerned with these flag settings, and FO8 and FO9 are not available for other use and must not be disturbed. To predict y given x, key in x and press [ $\frac{1}{2}$ ]. To predict x given y, key in y and press [ $\frac{1}{2}$ ]. In both cases the predicted value is left in the X-register.

7) New data may be added or deleted at any time via the [ $\Sigma$ +] or [ $\Sigma$ -] keys. However, step 5) must be performed after updating the data before any new predictions can be made using step 6). The parameters a and b are automatically destroyed after input of new data.

RINER TOYET	51 GTO 06	101 ST- 07	151 E†X
AS YED A	52+LBL B	102 RCL 10	152 RTN
	53+LBL 02	103 RCL 09	153+LBL B
	54 CF 08	104 FS? 08	154+LBL 04
05 ALDL H	55 CF 09	185 EtX	155 FS2 88
NO+FRF 01	56 STO 87	186 510 89	156 EN
86 CF 10	57 2	107 001 02	157 DCL QQ
07+LBL 06	50 4/40	101 KUL 00	107 KUE 07
08 STO 09		105 KIN	108 53 09
09 X<>Y	59 5F 09	109+LBL 10	159 EN
18 STO 88	68 /	118 RCL 11	160 -
11 EREG 13	61 FRC	111 X<> 17	161 RCL 08
12 FC? 18	· 62 X=0?	112 STO 11	162 /
13 5+	63 SF 08	113+LBL 13	163 FS? 09
14 ES2 18	64 8	114 RCL 21	164 EtX
15 5-	65 ST+ 07	115 X<> 15	165 RTN
1.5 600	66 XEQ IND 07	116 STO 21	166+LBL e
15 KUN	67 RCL 17	117 RCL 22	167+1 BL - 89
17 KUL 88	68 PCL 13	118 X() 16	168 CLPC
18 ENTERT	40 PCI 15	110 017 10	160 CERG
19 X>0?	70 CTO 60	117 STU 22	107 35 21
20 LN		120+LBL 09	170 E
21 ST* Z	/] *	121 RIN	171 KIN
22 RCL 09	72 RCL 18	122+LBL 11	172+LBL E
23 828?	73 /	123 RCL 12	173+LBL 05
24 IN	74 -	124 X<> 17	174 .
25 ST# 7	75 STO 10	125 STO 12	175 STO 25
26 9754	76 RCL 14	126+LBL 14	176 4
20 AV71	77 RCL 13	127 RCL 19	177 STO 07
27 4KEG 17	78 X†2	128 X() 13	178+1 BL 87
28 FU? 10	79 RCL 18	129 STO 19	179 PCL 97
29 2+	89 /	179 001 29	100 VED D
30 FS? 10	00 -	130 KUL 20 171 V/X 14	100 AL& D
31 Σ-	01 -		181 RCL 25
32 Rt	82 510 2	132 510 20	182 RCL 10
33 FS? 10	83 /	133 RIN	183 ABS
34 CHS	84 SIU 88	134+LBL 12	184 X(=Y?
35 ST+ 12	85 RCL 13	135 RCL 23	185 GTO 15
36 Rt	86 *	136 X<> 17	186 ST0 25
37 FS? 10	87 ST- 09	137 STO 23	187 PCL 97
38 CHS	88 X<>Y	138 XEQ 14	198 570 26
79 CT+ 11	89 RCL 16	139 GTO 13	100 510 20
37 317 11 40 9/\ 7	90 RCL 15	149+1 BL C	107*LDL 1J
40 AV7 6	91 ¥+2	141+LBL 93	190 DSE 07
41 SIGN	02 DCL 10	142 552 99	191 GIU 07
42 SI+ L	72 KUL 10 07 CT ( 00	147 15	192 RCL 26
43 RCL 08	93 517 09	143 LR	193 XEQ 02
44 RCL 09	94 /	194 KUL 08	194 RCL 26
45 X() L	95 -	145 *	195 .END.
46 RTN	96 *	146 RCL 89	
47 PCL 98	97 SQRT	147 FS? 08	
49 001 99	98 ST/ 10	148 LN	
AGAI DI D	99 XEQ IND 87	149 +	
47▼LDL 4	190 8	150 FS? 08	
26 21 10			

B. 'CRVFIT' (GRAPHING OF CURVE FITS) FORTRAN PROGRAM

CCTC 100 CALL YAARE ("NUMBER CF MAIN RUICK BLADES\$", 1CC)	CALL YAAVE ('MAIN FOTCE SPEED (RPM)\$',100)	CALL YNAME ('TAIL FLICE SPEED (RPM)\$',100)	E CALL Y NAME ( MAIN FUTCE ELADE CHURD (FT) \$ , 100)	CALLYNAME ("TAIL FLICE ELADE CHORD (FT)\$", 100)	CALL YNAME ("MAIN FCICK ELAGE SPAN (FT)\$", ICC)	: CALL YNAME ("TAIL FCICE BLADE SPAN (FT)\$",1CC)	CALL YNAME ("CISK LCACING\$", 100)	C/LL YAME("FLSEL/CE LENGTH (FT)1",100)	I CALL YAAME ("FRONT FLAT FLATE AREA (SC FT) 1", ICO)	CALL YAME ('LENGTH CF TAIL (FT)\$',1CO)	CZLL YAME ( CPEKATING WEIGHT (LB) \$', 100)	GULL YAME ('LCAD REIGHT (LB)\$',100)	C/LL YAAME ('FUEL WEIGHI (LB)\$',100)	C ALL YNAME ("MAXIMLM CRCSS NEIGHT (LE)\$",10C)		CALL YAMET TAIN FLICK RALIUS TELLET JUUT (ALL YAXAN( (0.0)	CALL YTICKS(4)	※1111年2月11日年2月1日日本1月1日日本1月1日日、111日、111日、111日、111日、111	x(1)=15. GC TO(31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46),F V(1)=(.0366)*x(1)*x(1.512)	<pre>60 10 200 2 7(1)= 2340)(1) - 2.3(5 2 7 10 300</pre>	<pre>% (1) = 651.2512 (EXP ((36:(x(1))))</pre>
12	(1) ]	14	19	16	17	lε	15	2 C	ź 1	14	(1) (N	24	5	26	СС					· N 01	(*) (*)

GC TO 200 Y(1)=263577.28 X(1) (-1.650)	Y(1)=-210*()(1))*4.647		Y(1)=17.37C ALCG(X(1))-33.177	Y(1)=1.015. (EXP(.C52 (X(1))))	Y (1) = 2 • 393 Ex (EXP ( • 04 2 4 (X(1))))	Y (1) = -5014 () (1) ) ¥4 1.4C2	Y(1)=2.396 (X(1))-32.158	Y(1)=1.533% (X(1))-1C.740	Y (1) = 1 298 . 2444 (X(1)) - 23135 . 238	Y (1) = 51.755 - 4 (EXP (-127 × (1)))	۲ (1) = - C094* (x(1)) # 3.616	Y(1)=-1132 - (X(1)) - 3.615		К([+])=)([)+2。( Х([+])=)([)+2。( СС ТП/27.58.20.30.47.48.40 50.5])57.58.50 50 50	$\begin{cases} (1+1) = (-(366) \pm ((1+1)) \pm ((1-512)) \\ (0 - 16) \pm ((-(366)) \pm ((-(1-512))) \\ (0 - 16) \pm ((-(-(-(-(-(-(-(-(-(-(-(-(-(-(-(-(-(-$	Y (1+1) = 232. X(1+1) - 2.309	Y (I+I) = 651.251.7(E x F(036 x (X(I+I))))	€C 10 500 Y (I+1) = 283577.28°×X(I+1) · (−1.650)	Y (I+1) = 21 (* (X(I+1)) ** .647	V(I+1)=.037 *X(I+1)169	GC TC 200 Y(I+1)=17.37C:ALDG(X(I+1))-33.177	<pre>% (1+1) = 1 • 0 15½ (EXP ( • C 5 2· (X (1+1) ) ) )</pre>	66 16 300 Y (I+I )=2.3535.4 (EXF(.6432(X(I+1))))
40	u i m	36	17	ε Π	55	4 C	[ 7	25	11	44	11 7	46	СC		27	ź Ę	52	90	47	4 6	55	5	67

$\begin{array}{c} CC TU = 200 \\ P \left( 1 + 1 \right) = -5C 1^{\circ} \left( X \left( 1 + 1 \right) \right) * # 1.402 \\ \end{array}$	5 Y(1+1)=2.356×(X(1+1))-32.198	$\begin{array}{c} C & Y(1+1) = 1 \\ C & Y(1+1) = 1 \\ C & Y(1+1) = 1 \\ C & Y(1+1) \\$	7 Y(I+I)=1296.244 ( X(I+1))-23135.238	<pre>8 Y (1+1) = 91 • 755 • (Ε &gt; P (• 137 : X ([+1)))</pre> <pre>9 * * * * * * * * * * * * * * * * * * *</pre>	2 Y (1+1) = 00 5422 (X (1+1)) = 32.61 6	C Y (1+1) = 1132% (X(1+1)) **3.615		1 C/LL GFAF (15.,52,54,55,56,57,58,59,60,61,62,62,64,65,66),F	2 CALL GRAF (15.,5.0,45.,0.0,1.0,9.0)	2 ( LLL GRAF ( 15., 5., 45., C., 100., 600.)	4 CALL GRAF (15.,5.0,45.,5C0.,5)0.,3500.)	5 (ALL GFAF(15.,5.0,45.,6.),5,3.0)	<pre></pre>	7 CALL GRAF (15.,5.0,45.,1C.,5.0,40.)	6 CALL GRAF (15.,5.0,45.,0.0,1.),10.)	5 (ALL GFAF (15.,5.0,45.,3.0,1.0,16.)	C (ALL GFAF (15.,5.0,45.,20.,120.)	1 C/LL_GRAF(15.,5.0,45.,0.0,10.,70.)	2 CALL GRAF(15.,5.0,45.,1C.,10.,60.)	2 (ALL GFAF (15.,5.0,45.,0.0,50)0.,40000.)	4 (ALL GRAF(15.,5.0,45.,6.0,50)C.,30000.)	5 CALL GFAF(15.,5.0,45.,C.0,300C.,210C0.) GC TG 400
ć	¢	~	Ψ	w	£	Ú,	00	י עז •	-		41	41	<u>د</u> ا	u١	u ı	4.1	¢	¢	ć	Ś	Ŷ	ć

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<ul> <li>.0.30000.50000.)</li> <li>.0.30000.50000.)</li> <li>astructure of the second of the second</li></ul>	7.370 LA R -33.1774 . 1CG, 1.5, 0.5) 1.0150 E (EH.6).C52 R (EXFX)4 . 1CG, 1.5, 0. .3538 E (EF.8).043 R (EXFX)4 . 1CG, 1.5, 0. .501 R (EH.8)1.4C2(EXFX)4 . 100, 1.5, (.5) .356 % R - 32.1584 . 1CC, 1.5, (.5) .358 % R - 32.1584 . 1CC, 1.5, (.5) .533 R - 1C.74C4 . 1CC, 1.5, (.5) 1258.244 R - 23135.2364 . 1CC, 1.7, (.5) 1258.244 R - 23135.2364 . 1CC, 1.7, (.5) .132 % R (EH.8).137 % (EXFX)4 . 10C, 1.7, (.5) .132 % R (EF.8)3.816(EXFX)4 . 10C, 1.7, (.5) .132 % R (EF.8)3.816(EXFX)4 . 10C, 1.7, (.5) .132 % R (EF.8)3.816(EXFX)4 . 10C, 1.7, (.5)
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