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PEACETIME REPLACEMENT AND CRASH DAMAGE FACTORS FOR ARMY AIRCRAFT

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FINAL REPORT

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PEACETIME REPLACEMENT

AND CRASH DAMAGE

FACTORS FOR ARMY AIRCRAFT

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May 1989

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Army aircraft mishaps are among the highest concerns of Army management. The Army invests significant amounts of money into training aviators. The Worldwide Aviation Logistics Conference (WALC) meets annually at the U.S. Army Aviation Systems Command (USAAVSCOM) in St. Louis, Missouri. One of the issues that the WALC addresses is Safety. The WALC uses factors to assess probable accident rates for proposed flying levels. The Peacetime Replacement Factor (PTRF) relates flying hours to the expected number of aircraft losses. The Crash Damage (CD) Factor relates flying hours to the expected number of crash damaged aircraft. Flying hours are expressed in a per 100,000 basis. Annual updates are made to these factors by the Operational Systems Analysis Division of the Directorate for Systems and Cost Analysis at AVSCOM.

Army aircraft mishaps are defined by AR385-40 with specific dollar thresholds. The Class A accident is the most serious. It involves total loss of an aircraft with associated fatalities and/or injuries. Class A mishaps have a threshold of $500,00 or greater

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TITLE: Peacetime Replacement Crash Damage Factors for Army Aircraft

Item 19. ABSTRACT (Continued)

Linear regression analysis has been generally successful in generating
the PTRF and CD factors for most Army aircraft systems. Cumulative flying
hours are regressed against cumulative Class A or Class B accidents.
The Class A accident regression generates the PTRF. The Class B accident
generates the CD factor. These factors are calculated from the regression
equation. The slope of the regression line fitted to Class A accidents
and flying hour data points is the PTRF. The slope of the regression line
fitted to Class B accidents and flying hour data points is the CD factor.

Non-Linear regression analysis techniques have been applied to those
systems that do not fit the linear model well. A typical polynomial
equation is:

$$Y = B_0(X)^3 - B_1(X)^2 + B_2(X) - B_3$$

Statistical Analysis System (SAS) software is used to model these systems.

ACKNOWLEDGEMENTS

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I. INTRODUCTION.

A. Army aircraft mishaps are among the highest concerns of Army management. Loss of an aircraft is very expensive in terms of hardware as well as personnel costs. The Army invests significant amounts of money into training aviators. The Worldwide Aviation Logistics Conference (WALC) meets annually at the U.S. Army Aviation Systems Command (USAAVSCOM) in St. Louis, Missouri. One of the issues that the WALC addresses is Safety. The WALC uses factors to assess probable accident rates for proposed flying levels. The Peacetime Replacement Factor (PTRF) relates flying hours to the expected number of aircraft losses. The Crash Damage (CD) Factor relates flying hours to the expected number of crash damaged aircraft. Flying hours are expressed in a per 100,000 basis. Annual updates are made to these factors by the Operational Systems Analysis Division of the Directorate for Systems and Cost Analysis at AVSCOM.

B. Army aircraft mishaps are defined by AR385-40 with specific dollar thresholds. The Class A accident is the most serious. It involves total loss of an aircraft with associated fatalities and/or injuries. Class A mishaps have a threshold of $500,000 or greater. Class B accidents are defined as those between $100,000 and less than $500,000.

II. BACKGROUND. Linear Regression analysis has been used successfully to generate the PTRF and CD factors for most Army aircraft systems. Cumulative flying hours are regressed against cumulative Class A or Class B accidents. The Class A accident regression generates the PTRF. The Class B accident generates the CD factor. These factors are calculated from the regression equation. The slope of the regression line fitted to Class A accidents and flying hour data points is the PTRF. The slope of the regression line fitted to Class B accidents and flying hour data points is the CD factor. AVSCOM Regulation 710-7 requires the Directorate for Systems and Cost Analysis to review and provide updates to the PTRF factors.

III. DATA BASE.

    A. DATA SOURCES.

        1. The Fort Rucker Aviation Safety Center is the primary source for all data in this study. The Safety Center maintains records on Class A, B, C, D and E accidents. They also keep records on injury and damage losses. Class A accidents are the most serious because they often result in injury and loss of life.

        2. **Appendix A** contains the data base used in the latest update of the Crash Damage (CD) and Peacetime Replacement Factors (PTRF) provided to the 1989 WALC Conference. As mentioned before, Class A trends drive the PTRF factor and Class B accidents drive the CD factor. The Safety Office at AVSCOM provides this data through an electronic link. The Safety Office provides data on flying hours for rotary and fixed wing aircraft.

    B. MODEL DATA BASE. Data on Class A and B accidents along with associated flying hours are input via Statistical Analysis Systems (SAS) software to the Scientific and Engineering (S&E) computer system at AVSCOM. Data has been collected from 1974 through 1988 and is maintained in a SAS file. The SAS programs used for the linear model is contained in **Appendix B.** Typically, data is input in a free format manner. Variable names are assigned to the data elements, i.e., Class A, Class B, and flying hours. Variables are input to the appropriate SAS procedure. General Linear Models (GLM) is the procedure used for a linear regression. Non-Linear (NLIN) is the procedure used for fitting a curved line to accident and flying hour data points.

IV. ACCIDENT RATE MODELING.

A. LINEAR REGRESSION METHODS.

1. The GLM procedure shown in Appendix B uses a "straight-line"
fit to minimize the distance of actual data from the fitted line. It
does this through a least squares method. In general, the GLM procedure
has been successful in providing an indication of future accident rates.
There are many variables which play a part in aviation safety. Some
of these variables are:

        a. Flying hours.

        b. Maintenance.

        c. Training.

        d. Experience Levels.

        e. Aircraft Complexity.

2. Flying hours are not necessarily the most important variable.
However, they are relatively easy to capture for most systems. There
has been a satisfactory correlation shown between flying hours and
accident rates. Variables such as training are much harder to capture.
Aircraft complexity is hard to quantify. Maintenance is somewhat more
difficult to capture than flying hours. This is an area that should
be investigated further. It may be possible to model accident rates
with a multiple regression analysis model. This approach would be a
logical next step to further refine the present technique. Currently,
flying hours are used as an independent variable. Accident rates, i.e.,
Class A and Class B are the dependent variables.

B. <u>UH-1 LINEAR RESULTS.</u>

   1. Figure 4.1 contains a plot of the UH-1 cumulative Class A accidents versus cumulative flying hours. The general model that generates the straight line fit is plotted with the asterisks. The equation of the linear model is:

$$Y = a + bX$$

   where: Y = Cumulative Numbers of Class A or B Accidents
               (Calculated Value)

           b = Slope of the Line (Units of Accidents/Units of
               flying hours)
               This is the Crash Damage factor for Class B accidents
               and the Peacetime Replacement Factor for Class A accidents

           X = Cumulative Number of Flying Hours

   2. The SAS output listings for the UH-1 and the other aircraft studied are in Appendix B. The listing for the UH-1 shows that it had an R-squared statistic of .935 for the Peacetime Replacement Fa₃or and an F Value of 159.23. The R-Square is calculated by dividing the sum of squares for the model by the corrected total. The corrected total is the sum of the model sum of squares and the error sum of squares. Since the calculated value of F exceeds the table value at a 95% confidence level, the linear model's fit is significant at that confidence level.

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

$A = -8.9 + 4.16H$

$Slope = \dfrac{A}{H}$

$Slope = PTPF = 4.16$

Intercept = -8.9

FLTHR
(H)

Figure 4.1

AINC
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
-5.0
-7.5
-10.0
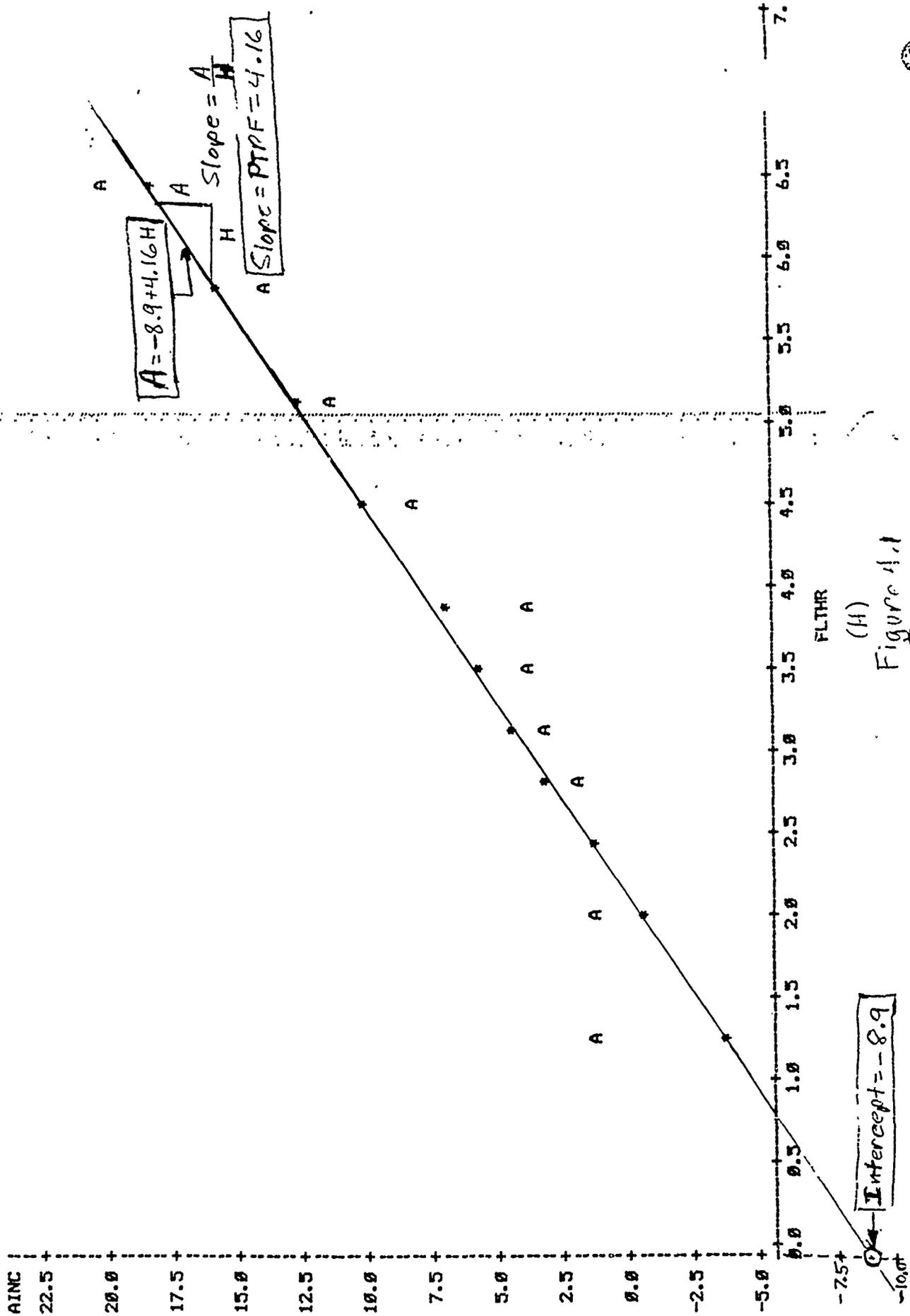
C. __NON-LINEAR REGRESSION METHODS__.

1. Class A or B accident rate data that did not lend itself to the linear methods was input to a non-linear model. The SAS procedure used for this approach is NLIN. **Appendix** contains the program listing for those aircraft with data that did not fit the linear model well.

2. The following aircraft were modeled with a non-linear regression equation:

OH-6A   UH-1 (all models except H)

OH-58 (A,B&C Models)   UH-1H

TH-55

3. The NLIN procedure requires the user to input a hypothesized model. The first derivative of each constant in the model must also be specified. A typical model used was a "Cubic" equation. The Cubic equation is so named because the largest exponential term in the model is of degree 3. The general form of the model used in this study was:

$$A = B0(H)^3 - B1(H)^2 + B2(H) - B3$$

where: B0, B1, B2 & B3 = Constant Coefficients generated by the SAS Model

A = Number of Cumulative Class A or B Accidents

H = Number of Cumulative Flight Hours

4. Figure 5.1 contains an example of a non-linear regression model applied to the UH-1 Class B Data Base. Non-linear equations are contained in **Table 1** for the UH-1, UH-1H, OH-58, OH-6 and the TH-55 aircraft. These are all cubic equations that have been fit with the SAS NLIN procedure. This type of equation will have a number of minimum and maximum points equal to one less than the power of the equation. For example, a cubic equation will always produce two minimum/maximum points.

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CUBIC FIT UH-1 PRED. CLASS B INCIDENTS
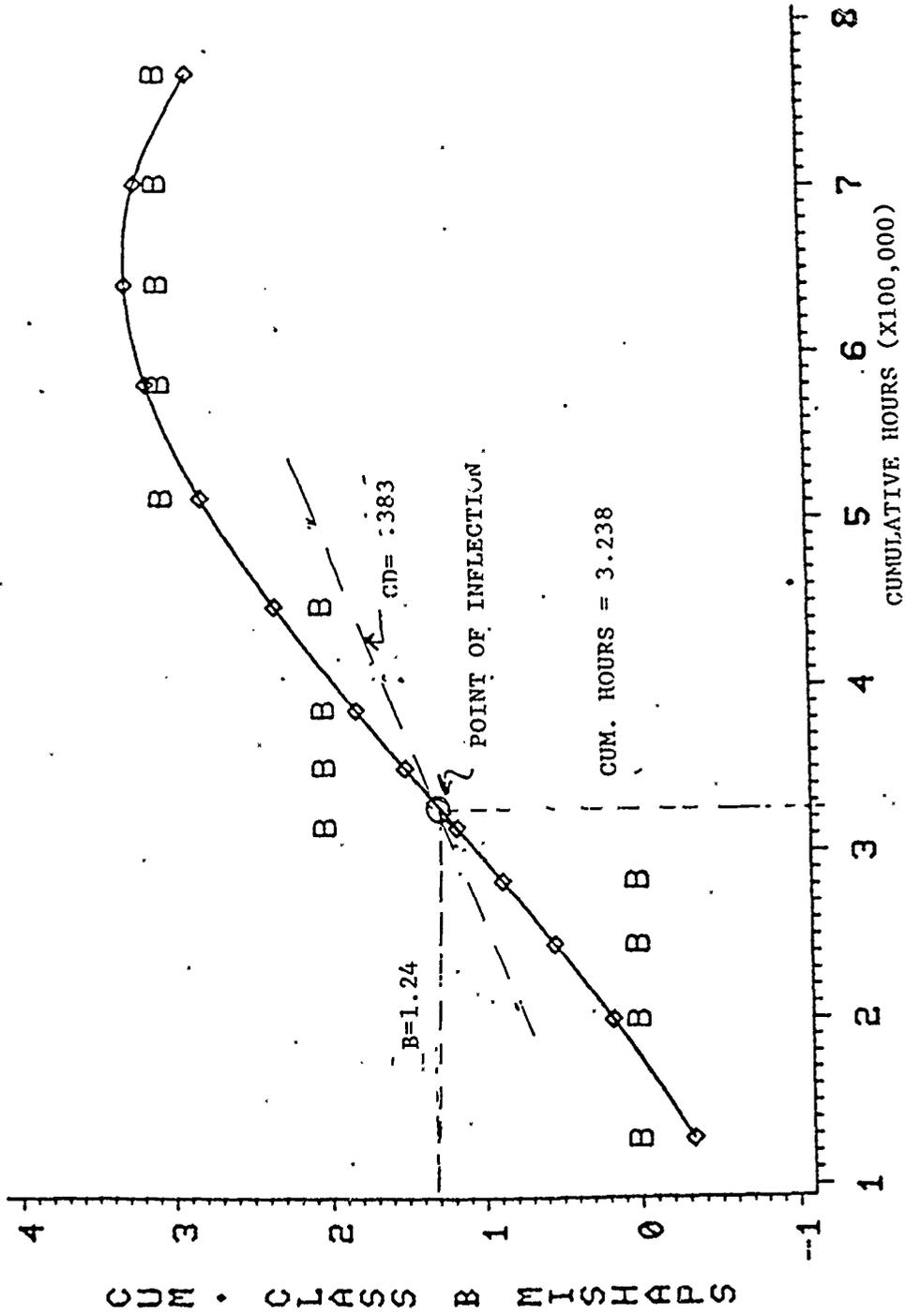
D. <u>NON-LINEAR REGRESSION METHODS</u>. Since a non-linear curve fit is not a straight line the slope is not a constant. This makes it impossible to generate a replacement or crash damage factor directly from the regression equation. Therefore, another approach is to use the area of the curve which is the "high" point or maximum for the range of data being studied. This is commonly known as the local maximum. The first derivative solution of the non-linear equation will give the points where the slope of the curve equals zero. Two of these points are locations on the curve where the minimum and maximum points will occur. The high point of the fitted curve would give a relative maximum area in which to find a point slope factor. The point slope factor will be the slope of a straight line which touches the curve at the point where the curve changes from an increasing to a decreasing slope. This point is also known as the point of inflection. It is found by taking the second derivation of the curve function and setting it equal to zero.

TABLE 1

NON-LINEAR MODELS

AIRCRAFT	MODEL	R^2	F
UH-1H[1]	B $=-.0279(H)^3+.27(H)^2-.0295(H)-.751$	.960	23.7
UH-1H	A $=-.00004(H)^3+.008(H)^2+.06375(H)+4.311$	.956	266.8
OH-6A	A $=-.1218(H)^3+.856(H)^2-1.332(H)+.449$	.931	13.56
OH-58[2]	A $=-.00013(H)^3+.0089(H)^2-.1028(H)+.2599$	.959	23.36
TH-55	A $= .07974(H)^3-1.715(H)^2+11.776(H)+5.619$	.9995	2210.6

FOOTNOTES: [1]/ Includes all models except UH-1H.

[2]/ Includes A, B, & C Models.

V. NON-LINEAR MODELING RESULTS.

A. GENERAL. The aircraft systems shown in Table 2 were modeled using the non-linear approach described in Section IV of this report. In general, there was an improvement observed in the fit of the non-linear versus the linear model. Table 2 also shows the R-squared value with the linear and with the non-linear methods. Table 2 also contains the point slope factor that was generated by the non-linear method. The R-squared values are significantly better with the non-linear equation. This is because the line will fit the discrete increases in cumulative incidents much better than a straight line. A straight line fit is much more limited in its capabilities.

TABLE 2
LINEAR/NON-LINEAR
MODELING COMPARISON

AIRCRAFT	FACTOR		R-SQUARED		% Improvement Non-Linear Model
	Linear	Non-Linear	Linear	Non-Linear	Over Linear Model
UH-1H [1]	.572	.383	.784	.960	22.4
UH-1H	.491	.512	.902	.996	10.4
OH-6	.368	.417	.761	.931	22.3
OH-58 [2]	.072	.460	.884	.959	8.5
TH-55	1.305	4.36	.595	.9995	68.0

FOOTNOTES: [1] Includes all models except UH-1H.

[2] Includes A, B & C Models.

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B. UH-1 RESULTS. The UH-1 aircraft systems analyzed consisted of all UH-1 other than the "H" Model. The "H" model was analyzed on its own because it represents the largest number of aircraft in the UH-1 fleet. Class B accidents were studied for this system. Appendix B-1, page 1, contains the data for the UH-1 system. It was found that a cubic equation, i.e., where the highest variable exponent is equal to three fit well. The derived equation is:

$$B = -.0279(H)^3 + .271(H)^2 - .0295(H) - .751 \quad (5.1)$$

where:

B = Cumulative Number of Clsss B Accidents

H = Cumulative Flying Hours

The equation (5.1) increases from the y axis up to the point where cumulative flying hours equal to 323,800. At this point on the curve, cumulative accidents are equal to 1.32. The slope of the curve is then equal to the number of accidents (A) divided by the number of hours (H).

$$\text{Slope} = \frac{A}{H(\text{per } 100,000)} \quad (5.2)$$

$$= \frac{1.32}{3.238}$$

$$= .407$$

The second derivative of the regression equation is taken and set equal to zero. The resulting value of H (Hours Flown) is at the point where the model equation changes from an increasing to a decreasing slope. The following process is used:

(1) Take the first derivative of equation 5.1 with respect to H.

$$\frac{dB}{dH} = -.0837H^2 + .542H + .0295 \quad (5.1.1)$$

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(2) Take the second derivative of equation 5.1.1 with respect to H.

$$\frac{d^2B}{dH^2} = -.1674H + .542 \quad (5.1.2)$$

(3) Set equation 5.1.2 equal to zero and solve for the value of H.

$$-.1674(H) + .542 = 0$$
$$.542 = .1674(H)$$
$$H = 3.238$$

(4) Calculate the value of B from equation 5.1 when H equals 3.238.

$$B = -.0279(3.238)^3 + .271(3.238)^2 + .0295(3.238) - .75$$
$$= -.9472 + 2.8413 + .0955 - .75$$
$$= 1.2397$$

(5) Calculate the value of the slope at the point where B equals 1.2397 and H equals 3.238.

$$Slope = \frac{1.2397}{3.238} = .383$$

Therefore, the new peacetime replacement factor for the UH-1 becomes .383.

Figure 4.1 contains the linear plot for the UH-1. As a comparison,

Figure 5.1 contains the plot of the UH-1 non-linear curve. The CD factor

of .383 is shown also.

C. UH-1H RESULTS.

1. The UH-1H aircraft system was modeled with a cubic equation.

Class B accidents were studied to determine a better fit than was possible

with the linear model previously used. It was found that the following

equation fit very well, resulting in a R-Squared value of .9995:

$$B = -.00004(H)^3 + .0181(H)^2 + .08376H + 4.311 \quad (5.3)$$

2. The following procedure is used to calculate the CD factor:

a. Take the first derivative of equation 5.3 with respect to H.

$$\frac{dB}{dH} = -.00012(H)^2 + 0612(H) + .08376 \quad (5.3.1)$$

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b. Take the second derivative of equation 5.3 with respect to H.

$$\frac{d^2B}{dH} = -.00024(H)+.0162 \quad (5.3.2)$$

c. Set equation 5.3.2 equal to zero and solve for H.

$$-.00024(H)+.0162 = 0$$
$$.0162 = .00024(H)$$
$$H = 67.5$$

d. Calculate the value of B in equation 5.3 when H equals 67.5.

$$B = -.00012(67.5)^3+.0081(67.5)^2+.08376(67.5)+4.311$$
$$= 34.57$$

e. Calculate the slope of a straight line at the point where H equals 67.5 and B equals 34.57. This will become the new CD factor.

$$CD = \frac{34.57}{67.5} = .512$$

The calculated value of F for the model used in equation 5.3 is $\sim$54.7. The table value of F at a 95% confidence level is:

$$F(4,11,.95) = 3.36$$

Since the calculated value of F exceeds the table value, it can be inferred that the regression model exhibits a significant level of fit at 95% confidence.

Figure 5.2 contains the plot of the non-linear curve generated by equation 5.3 and the crash damage factor location on the curve.

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CUBIC FIT UH-1H CUM. CLASS B INCIDENTS
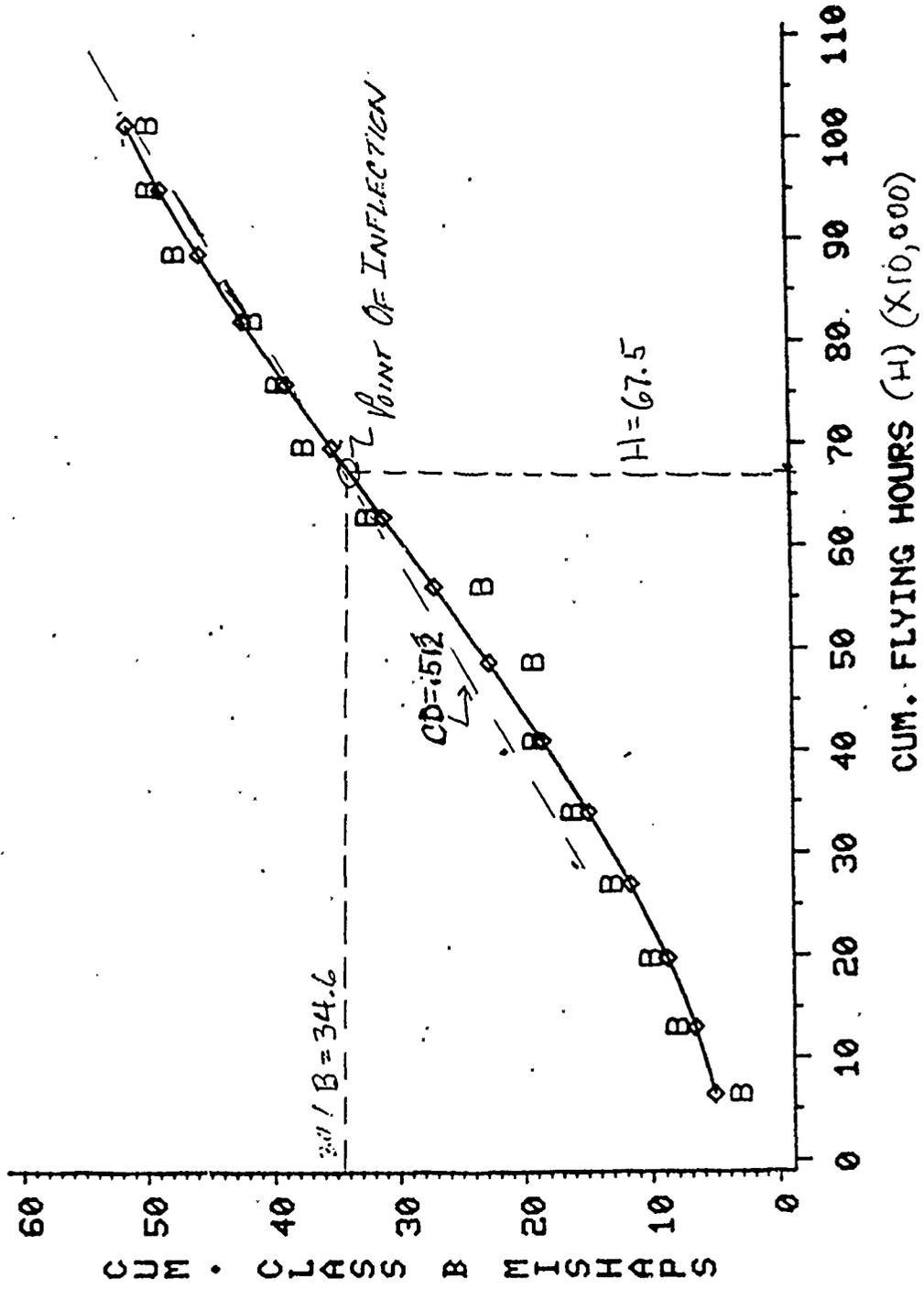
Figure 5.2

D. OH-58 RESULTS.

1. The OH-58 systems analyzed consisted of the "A" and "B" models. The Class B accident data was input to SAS with a cubic equation model. The R-square statistic was calculated at .959 for this aircraft. The derived equation from the SAS program was:

$$B = -.00013H^3 + .0089H^2 - .1028H + .2599 \quad (5.4)$$

2. Calculation of Crash Damage (CD) Factor: The point of inflection for equation 5.4 is calculated by setting the second derivative equal to zero and solving for the value of H (cumulative hours).

    a. First Derivative with respect to H:

$$\frac{dB}{dH} = -.00039(H)^2 + .0178(H) - .1028$$

    b. Set Second Derivative equal to zero and solve:

$$-.00078(H) + .0178 = 0$$
$$.0178 = .00078(H)$$
$$H = 22.8 \text{ Hours}$$

    c. Calculate A when H = 22.8 hours from equation 5.3

$$B = -.00013(22.8)^3 + .0089 (22.8)^2 - .1028(22.8) + .2599$$
$$B = -1.54 + 4.667 - 2.34 + .2599$$
$$B = 1.05$$

    d. Slope = $\dfrac{\text{Cumulative Accidents}}{\text{Cumulative Hours (Per 100,000)}}$

$$= \frac{1.05}{2.28}$$

$$= 0.46$$

    e. CD factor for the OH-58 equals 0.46.

3. Several points can be calculated with the slope factor of .46:

Flight Hours (Cumulative, Per 100,000)	Class B
1.0	.46
1.5	.69
2.0	.92
2.5	1.15
3.0	1.38

4. Figure 5.3 shows the cumulative hour/accident curve, the point of inflection corresponding to a slope of .46 where Accidents equal 1.05 and hours equal 280,000. Also the straight line generated by a slope of .46 has been plotted for the data pairs shown above.

E. OH-6 RESULTS.

1. The OH-6 Class B accidents and flying hours were modeled by the following cubic equation:

$$A = -.1218H^3 + .8564H^2 - 1.1332H + .449 \quad (5.5)$$

The first and second derivatives of equation 5.5 were calculated to find the point of reflection.

$$\frac{dA}{dH} = -.3654H^2 + 1.712H - 1.1332$$

$$\frac{d^2A}{dH} = -.7308H + 1.712$$

2. Setting the second derivative equal to zero and solving for H (Cumulative Hours) results in the point of reflection on the curve shown in Figure 5.6.

$$-.7308H + 1.712 = 0$$
$$H = 2.343$$

3. The value of H equal to 2.343 ᵗed in equation 5.6 to calculate the number of accidents for this flying level.

$$A = -.1218(2.343)^3 + .856(2.343)^2 - 1.1332(2.343) + .449$$
$$A = -1.567 + 4.699 - 2.655 + .449$$
$$A = .926$$

CUBIC FIT OH-58 CUM. CLASS B INCIDENTS
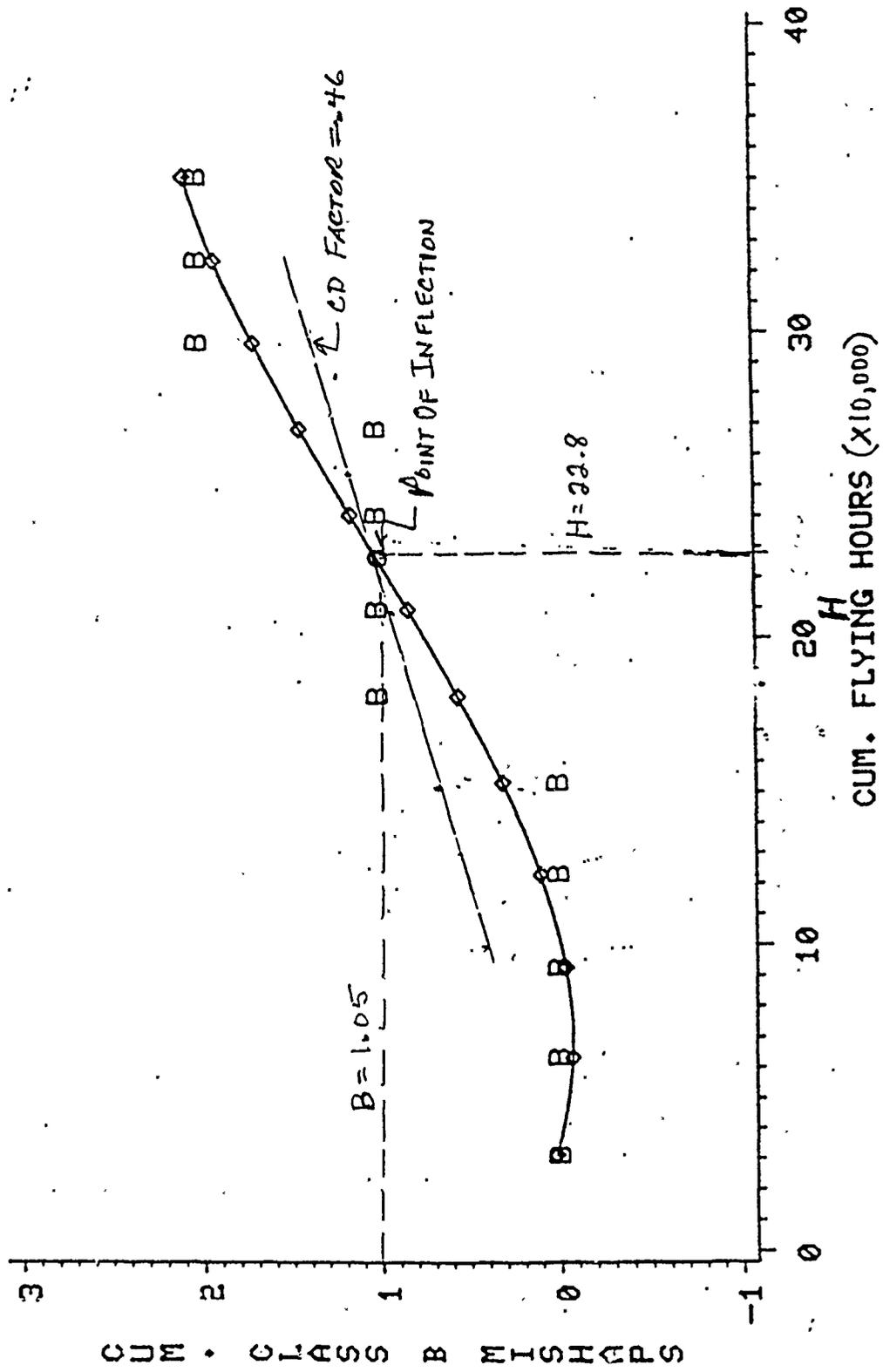
Figure 5.3

4. The slope of a straight line at the point on the curve where H=2.343 and A=.976 becomes the Crash Damage (CD) factor for the OH-6.

$$CD = \frac{.976}{2.343} = .4166$$

5. Several points on the straight line with a slop equal to .4166 were calculated as in the case of the OH-58 system. This line is plotted on Figure 5.4.

6. The R-Squared statistic for the curve generated by the model equation (5.4) is equal to .931. This is a big improvement over the linear model fit of .761. The F test will determine if the curve fitted by the non-linear model is significant. If the calculated F statistic is greater than the table value with a level of significance equal to .95 and 4 degrees of freedom. The table value equals

$$F(4,9,.95) = 3.63$$

7. The calculated value of F from the regression model is:

$$F = \frac{\text{Sum of Squares (Regression)}}{\text{Sum of Squares (Residual)}}$$

$$= \frac{5.5885}{.4115} = 13.58$$

8. Since the calculated value of F is greater than the table value, the regression model exhibits a significant level of fit at the 95% level of confidence.

F. TH-55 RESULTS.

1. The TH-55 model A aircraft was modeled for the occurrence of Class A accidents. A cubic equation was used to model this system:

$$A = .0797H^3 - 1.715H^2 + 11.776H + 5.619 \quad (5.8)$$

CUBIC FIT OH−6 CUM. CLASS B INCIDENTS

CUM. FLYING HOURS (X 100,000)
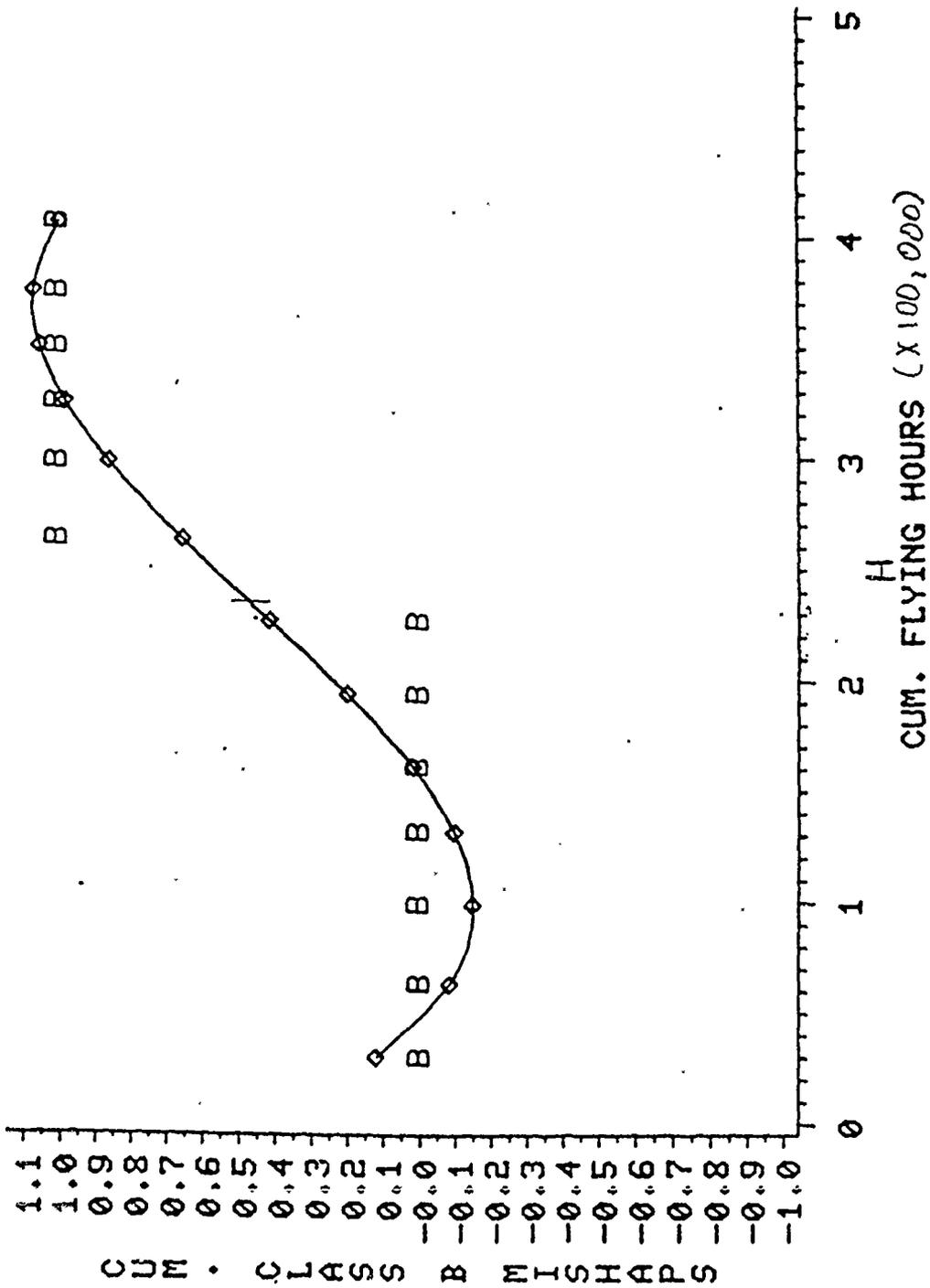
Figure 5.4

2. The first and second derivative of equation 5.8 were calculated to find the point of inflection.

    a. <u>First Derivative of H With Respect to A</u>

$$\frac{dA}{dH} = .2391H^2 - 3.43H + 11.776$$

    b. <u>Second Derivative of H With Respect to A</u>

$$\frac{d^2A}{dH} = .4782H - 3.43$$

3. The next step is to set the second derivative of equation 5.6 equal to zero and solve for H.

$$.472H - 3.43 = 0$$
$$H = 7.17$$

4. The value of H equal to 7.17 is used in equation 5.8 to calculate the number of accidents (A).

$$A = .0797(7.17)^3 - 1.715(7.17)^2 + 11.776(7.17) + 5.619$$
$$A = 29.3776 - 88.1663 + 84.4339 + 5.619$$
$$A = 31.264$$

Figure 5.6 displays the regression plot for the TH-55 non-linear fit.

5. The slope of a straight line at the point where H equals 7.17 and A equals 31.264 becomes the Peacetime Replacement Factor for the TH-55A.

$$PTRF = \frac{31.264}{7.17} = 4.36$$

6. The R-Squared statistic was also improved for the system. It increased from .595 to .9995. The table value of F at a 95% confidence level is:

$$F(4,8,.95) = 3.84$$

7. The calculated value of F is:

$$F = 10,203.38/4.6156 = 2,210.6$$

8. Since the calculated value of F far exceeds the table value, it can be inferred that the regression model exhibits a significant level of fit at 95% confidence.

9. Figure 5.5 contains the non-linear curve fitted to TH-55 Class A mishaps.

CUBIC FIT TH-55 CUM. CLASS A INCIDENTS
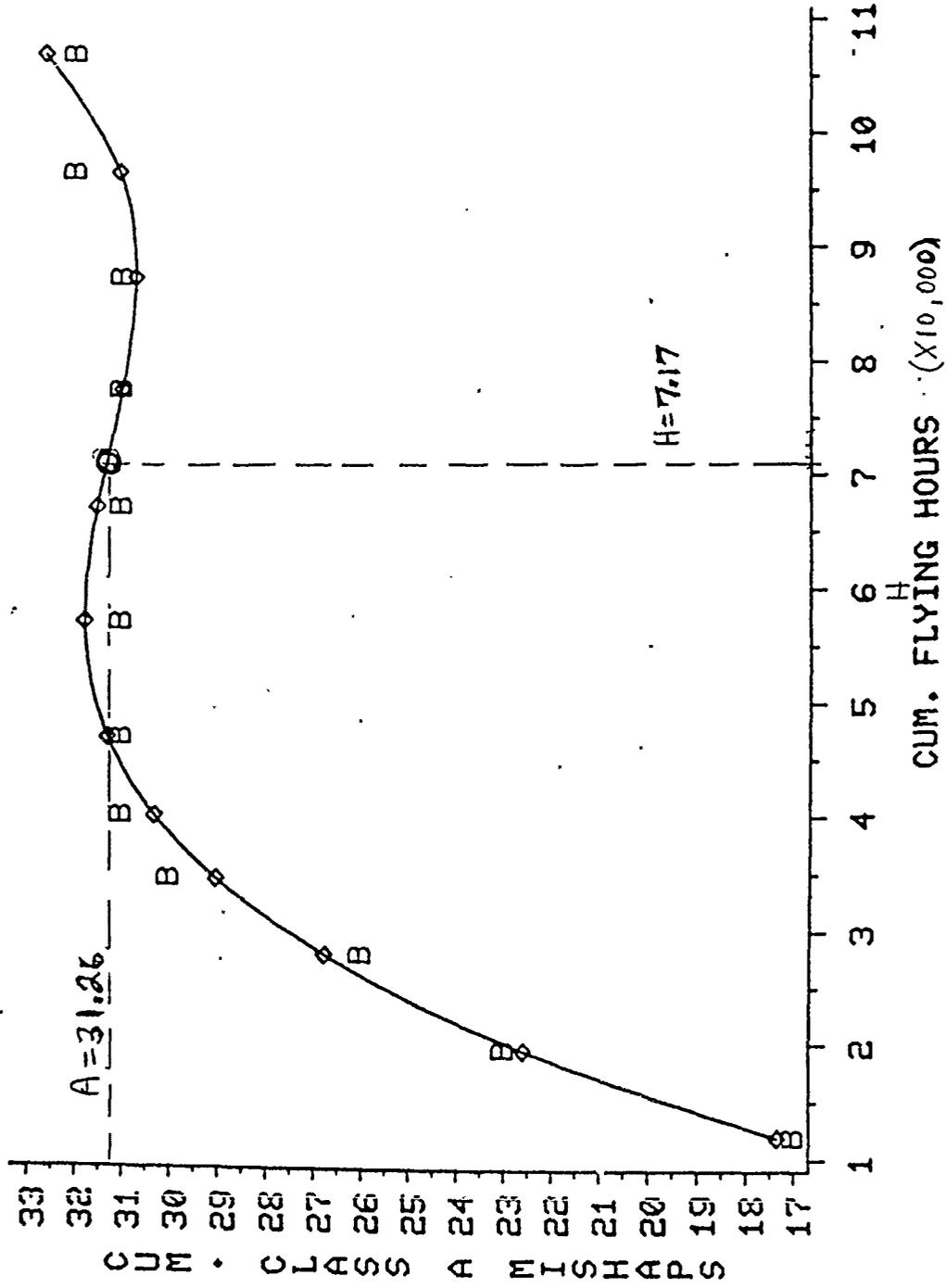
Figure 5.5

VI. CONCLUSIONS.

A. <u>DATA BASE</u>. The least squares regression analysis tool has proven to be a useful method for assessing Class A and B accident rates. The linear method is usually acceptable when there is sufficient data history present. The systems with a smaller occurrence of accidents do not generally fit this type of model well. Examples of these are the Class B accidents for the UH-1, OH-58, OH-6 and TH-55 aircraft. For these aircraft, Class B occurrences are few and far between. Several years may pass before one occurs. Currently, most systems in the data base have fifteen years of data available. This is enough data to get a pretty good idea of trends in accident rates.

B. <u>LINEAR MODEL</u>. The General Linear Models procedure available with Statistical Analysis System (SAS) does a good job of describing accident rates for the aircraft studied. SAS provides enough statistics for the user to judge whether the model fit is satisfying. SAS will also provide a 95% confidence level for each point on the regression line.

C. <u>NON-LINEAR MODEL</u>.

1. The Non-Linear (NLIN) Procedure available with SAS provided a lot of flexibility for the user. It will allow the user to choose almost any type of hypothesized model to fit his or her data. Some models which may be tried are:

      a. $Y = aX^b$

      b. $Y = ae^{bX}$

      c. $Y = b_0X^n + b_1X^{n-1} + .. + b_nX^{n-(n+1)}$

2. Along with the SAS plotting procedures, the NLIN procedure provides a fast way to try any equation desired and see the results on a terminal instantly.

VII. CAUTIONS. None of these tools (GLM and NLIN SAS procedures) are meant to provide infallible answers to the user. As with any automated tool, the output is only as good as the input. High R-squared values do not tell the complete story about what is going on with a data base. They should be balanced with other statistical tests of significance. Ideally, the residuals from the regression equation should be plotted and analyzed. Also, the first equation that fits should not be immediately accepted as the best possible model. Several others should be tried and the results compared. Also, one should not extrapolate beyond the range of the data base because the results obtained may be unrealistic.

REFERENCES

1. AR 385-40, Accident Reporting and Records, 1 April 1987,

w/AMC Supplement 1, 10 August 1987.

2. AVSCOM Regulation 710-7, Worldwide Aviation Logistics Conference

(WALC), 13 March 1989.

APPENDIX A

ACCIDENT AND FLYING HOUR

DATA BASE

NUMBER OF CLASS A, B, AND C AIRCRAFT ACCIDENTS USING CURRENT DOD CRITERIA AND TOTAL FLIGHT HOURS FOR EACH CLASS OF AIRCRAFT, CY 1971-1981

CY and Accident Class (flight hours shown at bottom of each cell)

Year	1974			1975			1976			1977			1978			1979			1980			1981			1982			1983			1981		
Class	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
UH-1	128,220			71,998			64,870			38,311			32,010			35,422			35,262			62,154			65,502			68,453			59,212		
UH-1H	612,218			655,387			629,291			721,829			706,185			697,906			766,217			741,788			669,948			688,587			621,601		
AH-1	65,285			61,986			60,061			72,558			80,991			82,252			93,712			106,902			110,174			111,527			116,742		
CH-47	45,120			48,031			50,117			55,247			57,911			49,851			53,571			57,733			42,584			55,062			53,070		
CH-54	8,255			8,486			8,125			8,014			8,728			6,387			5,291			6,252			6,907			7,354			7,802		
OH-6	30,172			33,634			35,581			32,702			29,539			32,405			32,002			36,334			34,426			27,110			35,059		
OH-58	312,847			320,251			293,776			301,226			298,081			280,669			282,264			307,247			281,419			278,217			272,228		
TH-55	116,903			74,802			81,637			81,668			53,261			68,679			100,409			99,471			102,757			97,928			92,021		
TH-6C																1,639			22,671			40,220			55,638			68,291			71,651		
TH-1C	8,256			8,511			9,221			10,929			10,773			10,674			10,965			7,463			906			951			498		
C-12				829			9,719			20,610			21,252			43,794			50,666			58,575			60,751			61,651			56,957		
OV-1																177			1,275			846			897			61			2,338		
OV-6																															224		
T-41	32,035			21,608			24,164			21,649			18,986			12,411			6,272			3,574			1,358			432			681		
T-42	26,249			26,382			26,899			26,007			21,234			1,705			20,255			20,407			18,661			19,070			19,217		
U-8	31,058			34,911			35,881			32,913			35,319			14,982			11,285			11,065			9,955			10,890			9,216		
U-9	428			559			440			341			311			309			266			167						170			122		
U-21	49,519			53,206			50,459			49,627			50,286			46,958			50,741			50,719			56,440			53,478			54,402		
JV-1	20,244			19,232			21,7061			22,435			21,451			21,639			21,058			19,221			18,517			20,116			18,482		
X-17				629			9,719			20,610			31,752			47,794			50,666			58,575			60,751			61,651			56,957		
XV-1													1,100			2,072			2,301			2,943			2,986			3,475			3,514		
U-21	511									481			808			660			471			361			288								

* UH-1/except UH-1H

ALL FY88 PRAMS

DMS3T7	A	B	C	D	E	FATAL	DISAB	DMGCOST	INJCOST	TOTCOST
01/18/89 PAGE ::::										
AH1E	0	0	0	8	43	0	0	4698	0	4698
AH1F	4	2	2	56	341	2	4	7364651	503230	7867881
AH1P	0	0	0	13	52	0	1	34964	0	34964
AH1S	0	0	2	18	142	0	0	109041	0	109041
AH6C	2	0	0	0	0	2	0	740900	660000	1400900
AH6G	0	1	0	1	0	0	0	108227	0	108227
AH64	0	0	0	0	1	0	0	0	0	0
AH64A	0	1	5	17	872	0	0	436639	0	436639
A200	0	0	0	1	0	0	0	1000	0	1000
BE20	0	0	0	0	1	0	0	0	0	0
BE65	0	0	0	0	3	0	0	0	0	0
CE31	0	0	0	0	1	0	0	0	0	0
CH47B	0	0	0	0	3	0	0	0	0	0
CH47C	1	1	2	18	94	0	5	4458274	94830	4553104
CH47D	1	4	4	44	96	10	10	6368683	2460945	8829628
CH54A	0	0	0	1	15	0	0	100	0	100
CH54B	0	0	1	0	5	0	0	60000	0	60000
C12C	0	0	1	14	53	0	0	119822	0	119822
C12D	0	0	0	4	24	0	0	1546	0	1546
C12F	0	0	0	2	6	0	0	2100	0	2100
C12G	0	0	0	0	3	0	0	0	0	0
C12L	0	0	0	0	3	0	0	0	0	0
C20E	0	0	0	0	3	0	0	0	0	0
C680	0	0	0	0	2	0	0	0	0	0
C7A	0	0	0	0	8	0	0	0	0	0
D330	0	0	0	1	13	0	0	6626	0	6626
EH1H	0	0	0	0	2	0	0	0	0	0
EH1X	0	0	0	1	2	0	0	1952	0	1952
EH60A	0	0	0	2	10	0	0	4239	0	4239
G159	0	0	0	1	2	0	0	3914	0	3914
K	0	1	0	0	0	0	0	100000	0	100000
K27	0	0	0	0	1	0	0	0	0	0
MH6B	0	0	1	0	1	0	0	10000	0	10000
MH6H	1	0	0	0	0	0	0	978000	0	978000
OH58A	5	0	1	27	280	5	5	1104606	1257000	2361606
OH58C	1	0	2	22	265	0	2	521115	0	521115
OH58D	0	0	0	4	37	0	0	8375	0	8375
OH6A	1	0	2	4	63	0	1	216243	3090	219333
OV1C	0	0	0	0	1	●	●	0	0	0
OV1D	0	0	1	14	77	●	●	58496	0	58496
PA31	0	0	0	0	1	●	●	0	0	0
RV1D	0	1	0	2	40	●	●	161009	0	161009
SD330	0	0	0	1	4	0	0	5845	0	5845
TH55A	0	0	1	1	0	0	0	34907	0	34907
T34	0	0	0	0	1	0	0	0	0	0
T42A	1	0	0	0	9	3	0	104093	0	104093
UH1	0	0	1	0	0	0	0	51000	0	51000
UH1H	9	0	8	85	879	4	35	8508690	1519780	10028470
UH1M	0	0	0	5	38	0	0	11062	0	11062
UH1V	1	0	1	10	67	0	4	987479	17160	1004639
UH60A	5	3	2	99	502	17	9	22307841	2349415	24657256
UV18A	0	0	0	2	0	0	0	6900	0	6900
UV20A	0	0	0	0	1	0	0	0	0	0
U21	0	0	0	0	1	0	0	0	0	0
U21A	0	0	2	3	62	0	0	111153	0	111153
U21B	0	0	0	0	1	0	0			

U21F	0	0	0	1	6	0	1	0	340	340
U21G	0	0	1	0	7	0	0	106346	0	106346
U21H	0	0	0	1	35	0	0	128	0	128
U3A	0	0	0	0	1	0	0	0	0	0
U8F	0	0	0	0	16	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0
TOTAL	32	14	40	485	4203	43	77	55220837	8865790	64086627
COUNT OF AIRCRAFT		4,776								
COUNT OF ACCIDENTS		4,774								

19. 11 23 355

ALL FY88 FLIGHT HOURS

	881	882	883	884	]			OTHER	TOTAL
AH1E	2692	2616	3363	2758	0	0		0	11429
AH1F	18668	14499	18804	18190	0	0		0	70161
AH1G	0	0	0	0	0	0		0	0
AH1P	4267	3587	4792	3830	0	0		0	16476
AH1S	8144	8749	9189	10422	0	0		0	36504
AH6C	689	489	564	723	0	0		0	2465
AH6F	539	111	42	0	0	0		0	692
AH6G	1121	1217	1076	950	0	0		0	4364
AH64A	11262	11048	15837	19034	0	0		0	57181
A31T	0	0	0	0	0	0		0	0
A90	0	11	129	205	0	0		0	345
BE65	313	282	453	448	0	0		0	1496
BE80	2	13	38	14	0	0		0	67
B80	40	40	65	60	0	0		0	205
CE31	301	280	442	400	0	0		0	1423
CE40B	74	109	100	94	0	0		0	377
CH47A	0	0	0	0	0	0		0	0
CH47B	884	606	188	0	0	0		0	1678
CH47C	6751	5139	6835	5483	0	0		0	24208
CH47D	9846	6667	8772	10160	0	0		0	35445
CH54A	1152	983	1911	1662	0	0		0	5708
CH54B	558	577	964	879	0	0		0	2978
C12C	11351	9104	11276	9571	0	0		0	41302
C12D	4529	3650	4470	3809	0	0		0	16458
C12F	2239	2523	2848	3051	0	0		0	10661
C12L	417	500	517	435	0	0		0	1869
C20E	0	0	0	219	0	0		0	219
C6A	13	97	131	140	0	0		0	381
C680	167	91	180	101	0	0		0	539
C7A	619	800	753	729	0	0		0	2901
D330	620	510	383	376	0	0		0	1889
EH1H	747	828	807	595	0	0		0	2977
EH1X	111	104	276	154	0	0		0	645
EH6E	0	0	0	0	0	0		0	0
EH60A	415	447	919	1064	0	0		0	2845
EH60B	0	0	0	0	0	0		0	0
F10B	0	0	0	0	0	0		0	0
F86E	0	2	8	0	0	0		0	10
G159	117	58	166	109	0	0		0	450
MH6B	751	464	686	794	0	0		0	2695
MH6E	826	529	300	81	0	0		0	1736
MH6H	531	456	698	636	0	0		0	2321
OH58A	38722	33303	49391	46043	0	0		0	167459
OH58C	28441	21589	29517	31179	28	0	0	0	110726
OH58D	4392	3522	5209	5476	0	0		0	18599
OH6A	6635	6294	8624	10087	0	0		0	31640
OV1B	0	0	0	0	0	0		0	0

134,570 *611,331.* *96,86* *70290* *296,704* *31640*

O2A	47	36	32	65	0	0	0	180
RA3B	0	0	101	11	0	0	0	112
RC12D	1566	1919	1758	1876	0	0	0	7119
RC12G	683	723	720	778	0	0	0	2904
RV1D	1115	1237	1128	1256	0	0	0	4736
TH1G	0	0	0	0	0	0	0	0
TH55A	23963	18235	15644	0	0	0	0	57842
T28B	0	0	0	0	0	0	0	0
T41B	127	71	87	75	0	0	0	360
T42A	1368	1103	1154	1348	0	0	0	4973
UH1B	0	0	0	0	0	0	0	0
UH1D	0	0	0	0	0	0	0	0
UH1H	161940	129100	173193	169936	0	0	0	634169
UH1M	4245	3498	4919	4285	0	0	0	16947
UH1V	11245	9928	13460	15060	0	0	0	49693
UH60	0	0	0	0	0	0	0	0
UH60A	44607	37900	46266	48332	0	0	0	177105
UH61A	0	0	0	0	0	0	0	0
UV18A	436	402	569	511	0	0	0	1918
UV20A	142	65	143	149	0	0	0	499
U21A	9465	8663	10002	9488	0	0	0	37618
U21B	124	170	140	183	0	0	0	617
U21C	130	170	179	122	0	0	0	601
U21D	149	212	426	278	0	0	0	1065
U21F	571	616	614	558	0	0	0	2359
U21G	1096	920	890	1027	0	0	0	3933
U21H	3223	3247	3273	3237	0	0	0	12980
U3A	132	140	89	0	0	0	0	361
U3B	127	116	142	184	0	0	0	569
U8F	2484	2252	2828	3378	0	0	0	10942
OTHER	0	0	0	0	0	0	0	0
TOTAL	443034	367857	474328	456778	0	0	0	1741997

COUNT OF FLT HOUR RECORDS   3,536
END OF THIS QUERY - DO YOU WISH A PRINTED REPORT? (Y)ES (N)O

Handwritten annotations in right margin: 4736, 0, 57842, 4973, 63416, 66640, 177105, 59,173

Handwritten note at bottom:

THIS INFORMATION CAME FROM HOWARD EKTEND IN SAFETY OFFICE (X3524) - HE INFORMS ME THAT THIS COMES FROM SAME DATA BASE AS FT. RUCKER VIA MICROWAVE DATALINK

29

APPENDIX B

SAS LINEAR MODELS

UH-1 LINEAR REGRESSION FIT

10:01 FRIDAY, APRIL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	840.83719583	840.83719583	159.23	0.0001	0.935253
ERROR	11	58.08588107	5.28053464		ROOT MSE	AINC
CORRECTED TOTAL	12	898.92307692			2.27774139	1.9238

SOURCE	DF	TYPE I SS	F VALUE	PR > F	TYPE III SS	DF	F VAL	PR
FLTHR	1	840.83719583	159.23	0.0001	840.83719583	1	159.	5.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-8.88259362	-5.74	0.0001	1.54830461
FLTHR	4.15945583	12.62	0.0001	0.32962452

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	1.00000000	-3.55849015	4.55849015	-6.14834748	-0.95863281
2	1.00000000	-0.56368195	1.56368195	-2.73776673	1.65560262
3	1.00000000	1.39807317	-0.39807317	-0.62375058	3.23989762
4	2.00000000	2.88866639	-0.88866639	1.13493834	4.64246243
5	3.00000000	4.21969225	-1.21969225	2.59464626	5.84473825
6	4.00000000	5.71709635	-1.71709635	4.20677782	7.22721488
7	4.00000000	7.17290589	-3.17290587	5.73730539	8.69856639
8	8.00000000	9.75176851	-1.75176851	8.34157268	11.16196434
9	11.00000000	12.45541480	-1.45541480	10.92330468	13.98752491
10	14.00000000	15.32543932	-1.32543932	13.53245811	17.11842853
11	16.00000000	17.82111282	2.17888718	15.72910173	19.91312351
12	23.00000000	20.35838088	2.64161912	17.91972781	22.79683774
13	24.00000000	23.10362173	0.89637827	20.26212450	25.94711896

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   58.08588107
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   89.25441/.
FIRST ORDER AUTOCORRELATION   0.53057637
DURBIN-WATSON D   0.56727113

UH-1 LINEAR REGRESSION FIT

10:01 FRIDAY, APRIL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.
MODEL	1	15.71604541	15.71604541	39.87	0.0001	0.783745	
ERROR	11	4.39164690	0.39924063		ROOT MSE		BINC
CORRECTED TOTAL	12	20.30769231			0.63185491		.7692

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VAL	PR
FLTHR	1	15.71604541	39.87	0.0001	1	15.71604541	39.	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-0.68050904	-1.60	0.1382	0.42573056
FLTHR	0.57226626	6.31	0.0001	0.09063541

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	0.05199177	-0.05199177	-0.66012996	0.76411351
2	0.00000000	0.46402348	-0.46402348	-0.13245528	1.06050225
3	0.00000000	0.72154330	-0.72154330	0.19035813	1.25272847
4	0.00000000	0.93900448	-0.93900448	0.45678734	1.42122162
5	2.00000000	1.12212769	0.87787031	0.67529789	1.56896149
6	2.00000000	1.32814554	0.67185446	0.91271484	1.74337624
7	2.00000000	1.52843873	0.47156127	1.13369793	1.92317953
8	2.00000000	1.88324382	0.11675618	1.49548843	2.27099921
9	3.00000000	2.25521689	0.74478311	1.83373926	2.67649452
10	3.00000000	2.65008261	0.34991939	2.15797020	3.14307102
11	3.00000000	2.99344037	0.00655963	2.41820921	3.56867152
12	3.00000000	3.34252279	-0.34252279	2.67253690	4.01301468
13	3.00000000	3.72021852	-0.72021852	2.93835451	4.52208254

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   4.39164690
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   6.1033.95
FIRST ORDER AUTOCORRELATION   0.46261385
DURBIN-WATSON D   1.07604285

UH-1 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1974-1988   10:01 FRIDAY, APRIL ... 1989

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

BINC |
     |
3.5 +
     |
     |
3.0 +   B   B
     |
     |
2.5 +
     |
     |
2.0 +   B   B   B   B   B
     |
1.5 +
     |
     |
1.0 +   B B
     |
0.5 +   B B
     | * B
0.0 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
    0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5

                                    FLTHR

33.

UH-1H LINEAR FIT   10:01 FRIDAY, APRIL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	34126.41383183	34126.41383183	1083.83	0.0001	0.989953
ERROR	11	346.35539894	31.48685445		ROOT MSE	AINC
CORRECTED TOTAL	12	34472.76923077			5.61131496	.3876

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VAL
FLTHR	1	34126.41383183	1083.83	0.0001	1	34126.41383183	1083.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	12.45202382	3.80	0.0029	3.27471078
FLTHR	1.97325048	32.92	0.0001	0.05993790

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	12.00000000	25.12029190	-13.12029190	18.64533817	31.59524563
2	38.00000000	38.10428006	-0.10428006	32.34751650	43.84994363
3	55.00000000	51.52238333	3.47761667	46.45648879	56.39627787
4	66.00000000	65.72978679	0.27021321	61.31641291	70.14116963
5	88.00000000	79.54254016	8.45745984	75.64650632	83.43857460
6	98.00000000	93.35529352	4.64470648	89.80515288	96.90543417
7	110.00000000	108.54932223	1.45067777	105.12291307	111.97573139
8	124.00000000	123.15137578	0.84862422	119.56593610	126.73681547
9	141.00000000	136.37215400	4.62784600	132.43397233	140.31031567
10	148.00000000	149.98758232	-1.98758232	145.52941761	154.44574703
11	162.00000000	162.22173530	-0.22173530	157.20638664	167.24268396
12	172.00000000	174.45588828	-2.45588828	168.80556363	180.11271293
13	181.00000000	186.88736631	-5.88736631	180.55948759	193.21944563

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   346.35539894
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   567.33386317
FIRST ORDER AUTOCORRELATION   0.17801106
DURBIN-WATSON D   1.04689425

*UH-1H LINEAR FIT

10:01 FRIDAY, APRIL 7, 1987

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	2115.12869618	2115.12869618	100.91	0.0001	0.901758
ERROR	11	230.56361152	20.96932832		ROOT MSE	BINC
CORRECTED TOTAL	12	2345.69230769			4.57924511	23.

| | | | | | | | C.V. |
| | | | | | | | :1538 |

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VAL
FLTHR	1	2115.12869618	100.91	0.0001	1	2115.12869618	100.

| | | | | | PR |
| | | | | | 0. |

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > !T!	STD ERROR OF ESTIMATE
INTERCEPT	-1.46106746	-0.55	0.5954	2.67182075
FLTHR	0.49125308	10.05	0.0001	0.04890305

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	3.00000000	1.69277733	1.30722267	-3.59610663	6.97566127
2	5.00000000	4.92522262	0.07477738	0.22638819	9.62205765
3	10.00000000	8.26574359	1.73425641	4.13413611	12.39735167
4	13.00000000	11.80276579	1.19723421	8.20344482	15.49195477
5	15.00000000	15.24153738	0.75843262	12.86278189	18.42027287
6	16.00000000	18.68030897	-0.31969103	15.78376610	21.57685183
7	19.00000000	22.46295771	-3.46295771	19.66736677	25.25854865
8	13.00000000	26.09823053	-13.09823053	23.17238734	29.02357372
9	32.00000000	29.38962619	2.61037381	26.17649881	32.65275357
10	37.00000000	32.77927247	4.22072753	29.14107708	36.41665786
11	39.00000000	35.82504159	3.17495841	31.72631827	39.92177299
12	41.00000000	38.87081070	2.12918930	34.26559732	43.47602869
13	41.00000000	41.96570513	-0.96570513	36.80278215	47.12842811

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   230.56361152
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   284.41634141
FIRST ORDER AUTOCORRELATION   0.18492418
DURBIN-WATSON D   1.61869544

UH-1H CUM. ACTUAL & PRED. CLASS A INCIDENTS 1974-1988   19:51 FRIDAY, APRIL

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

```
AINC |
 225 -+
      |
 200 -+                                                        * A
      |
 175 -+                                               * A
      |
 150 -+                                          *
      |
 125 -+                                     *
      |
 100 -+                            A *
      |
  75 -+                   A    *
      |
  50 -+          A *
      |
  25 -+     *
      |
   0 -+  A
      +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
      0  3  6  9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84
                                              FLTHR
```

UH-1H CUM ACTUAL & PREDICTED CLASS B INCIDENTS 1974-1988   10:51 FRIDAY, APRIL

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

AH-1 LINEAR FIT   10:31 FRIDAY, APRIL
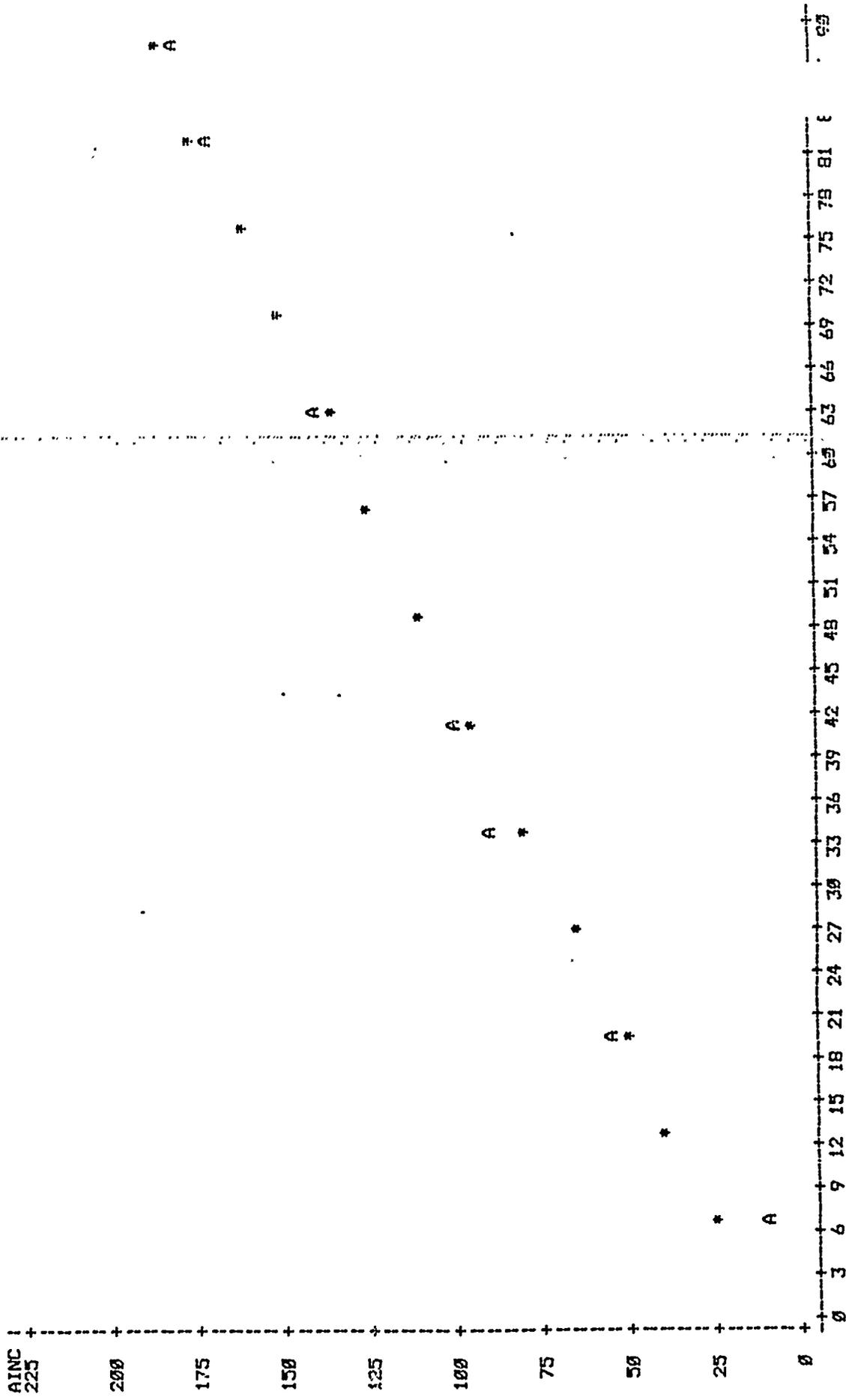
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	2796.57964095	2796.57964095	1500.80	0.0001	0.992724
ERROR	11	20.49728213	1.86338928		ROOT MSE	AINC
CORRECTED TOTAL	12	2817.07692308			1.36506618	16.153

SOURCE	DF	TYPE I SS	F VALUE	PR > F		TYPE III SS	DF	F VAL	PR
FLTHR	1	2796.57964095	1500.80	0.0001		2796.57964095	1	1500.	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	2.65347775	3.77	0.0031	0.70331294
FLTHR	4.01092121	38.74	0.0001	0.10353384

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	5.00000000	5.27260930	-0.27260930	3.84777277	6.69744583
2	7.00000000	7.86767533	-0.86767533	6.55958727	9.17576338
3	11.00000000	10.27422805	0.72577195	9.96638395	11.49007215
4	13.00000000	13.20226054	-0.20226054	12.11652668	14.29387439
5	16.00000000	16.45104672	-0.45104672	15.46646207	17.43363136
6	19.00000000	19.74000211	-0.74000211	18.84213465	20.63766956
7	23.00000000	23.47015883	-0.47015883	22.62799763	24.31232004
8	28.00000000	27.80195374	0.19804626	26.95944939	28.64445809
9	34.00000000	32.21396707	1.78603293	31.30622428	33.12779985
10	40.00000000	36.74630804	3.25369196	35.70621823	37.79239785
11	41.00000000	41.43908585	-0.43908585	40.21327923	42.64489247
12	46.00000000	46.57306500	-0.57306500	45.11974698	48.02632363
13	50.00000000	51.94769942	-1.94769942	50.23523175	53.66916719

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   20.49728213
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   30.03630-84
FIRST ORDER AUTOCORRELATION   0.30462011
DURBIN-WATSON D   1.29205921

AH-1 LINEAR FIT   10:01 FRIDAY, APRIL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	
MODEL	1	1674.38848501	1674.38848501	161.93	0.0001	0.936756	14.
ERROR	11	114.38074576	10.39824961			ROOT MSE	BINC
CORRECTED TOTAL	12	1788.76923077				3.22463170	1.3676

SOURCE	DF	TYPE I SS	F VALUE	PR > F		TYPE III SS	DF	F VAL	PR
FLTHR	1	1674.38848501	161.03	0.0001		1674.38848501	1	161.	5.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	4.54035000	2.73	0.0195	1.66141041
FLTHR	3.10354931	12.69	0.0001	0.24457421

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	1.00000000	6.56696770	-5.56696770	3.20112850	9.93280690
2	6.00000000	8.57496410	-2.57496410	5.48491655	11.66501245
3	11.00000000	10.43709368	0.56290632	7.58057230	13.28561567
4	13.00000000	12.70268468	0.78268468	10.12336249	15.28155567
5	16.00000000	15.21655961	0.78344039	12.69543587	17.55763336
6	17.00000000	17.76147004	1.23852996	15.64674307	19.85197762
7	24.00000000	20.64777090	3.35222910	18.65636430	22.63717750
8	27.00000000	23.99960415	3.00039585	22.00938695	25.98982134
9	32.00000000	27.41350838	4.58649162	25.25520723	29.57209934
10	33.00000000	30.92051910	2.07948090	28.44937942	33.37165978
11	34.00000000	34.55167179	-0.55167179	31.65579366	37.44753991
12	35.00000000	38.52421490	-2.52421490	35.09199491	41.95733489
13	38.00000000	42.68297097	-4.68297097	38.63767124	46.72827079

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   114.38074576
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   179.25766643
FIRST ORDER AUTOCORRELATION   0.55805474
DURBIN-WATSON D   0.42121347

AH-1 CUM. ACTUAL & FRED. CURVES A INCIDENTS 1974 - 1987   10:51 FRIDAY, AFRII

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

```
AINC |
  55 -+
     |
  50 -+
     |
  45 -+                                              *
     |
  40 -+                                  *
     |
  35 -+                     A        *
     |
  30 -+
     |
  25 -+            A *
     |
  20 -+        * A
     |      * A
  15 -+    *
     |   * A
  10 -+  A *
     | *
   5 -+*
     |
   0 -+--+----+----+----+----+----+----+----+----+----+----+----+
     0   1    2    3    4    5    6    7    8    9   10   11   12
                              FLTHR
```

AH-1 CUM. ACTUAL & PREDICTED CLASS B INCIDENTS 1974 - 1967   10:31 FRIDAY, APRIL

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

BINC
45 +
       *   B
40 +
           * B
35 +
       B
30 +   *
                    B
25 +   *
              B
20 +   *
             B *
15 +   B *
                 *
            B *
10 +   *   B
           *
 5 +
 0 +
   +----+----+----+----+----+----+----+----+----+----+----+----+
   0   1   2   3   4   5   6   7   8   9   10   11   12
                              FLTHR

41
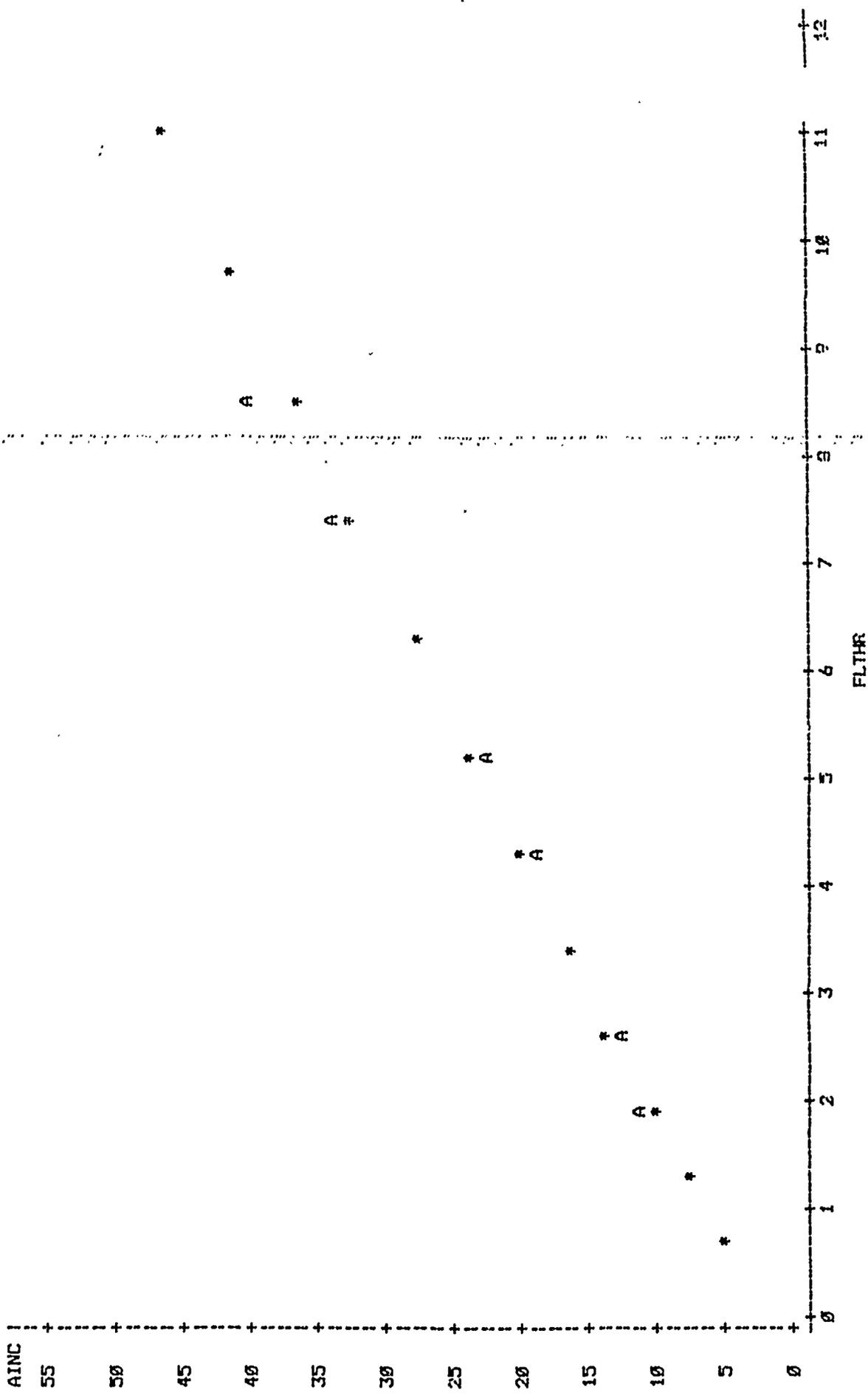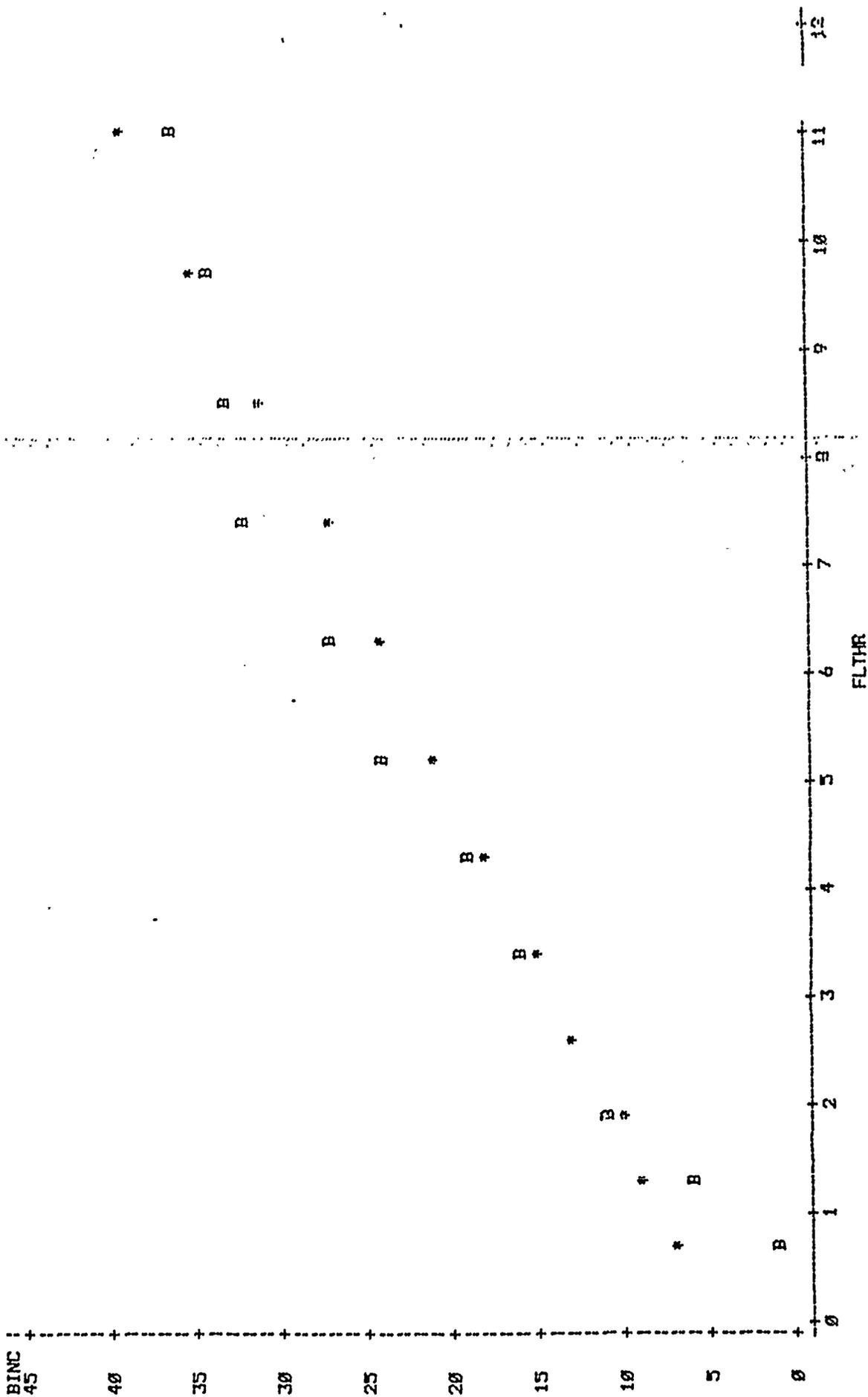
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE
MODEL	1	914.57149660	914.57149660	814.49
ERROR	11	12.35158032	1.12287094	
CORRECTED TOTAL	12	926.92307692		

	PR > F	R-SQUARE
	0.0001	0.986675

	ROOT MSE	AINC
	1.05945695	.9238

SOURCE	DF	TYPE I SS	F VALUE	PR > F
FLTHR	1	914.57149660	814.49	0.0001

TYPE III SS	F VAL	PR
914.57149660	814.	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-3.32228314	-5.45	0.0002	0.60969750
FLTHR	4.24216445	28.54	0.0001	0.14844270

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	-1.39634048	1.39634048	-2.61625799	-0.19242298
2	1.00000000	0.64414062	0.35585938	-0.43986375	1.72814498
3	2.00000000	2.78643366	-0.78643366	1.52571194	3.74295639
4	5.00000000	5.11962411	-0.11962411	4.28671798	5.93253023
5	5.00000000	7.58007949	-2.58007949	6.85144648	8.39851229
6	9.00000000	9.70116171	-0.70116171	9.03198725	10.37933618
7	13.00000000	11.99193052	1.00806948	11.34594616	12.63881487
8	15.00000000	14.40996425	0.59003575	13.73226770	15.03446989
9	17.00000000	16.23409496	0.76590504	15.50679268	16.96139725
10	19.00000000	18.56728541	0.43271459	17.74296871	19.39251011
11	21.00000000	20.81563257	0.18436743	19.87289113	21.72837461
12	23.00000000	22.97913644	0.02086346	21.90897570	24.04939717
13	25.00000000	25.26485675	-0.26485675	24.33159949	26.85281481

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   12.35158032
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   16.78566014
FIRST ORDER AUTOCORRELATION   0.25680249
DURBIN-WATSON D   1.30252453

CH-47 LINEAR FIT

10:01 FRIDAY, APRIL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	907.05812829	907.05812829	494.61	0.0001	0.979244
ERROR	11	20.17264094	1.83387645		ROOT MSE	BINC
CORRECTED TOTAL	12	927.23976923			1.35420694	3.4615

SOURCE	DF	TYPE I SS	F VALUE	PR > F
FLTHR	1	907.05812829	494.61	0.0001

SOURCE	DF	TYPE III SS	F VALUE	PR > F
FLTHR	1	907.05812829	494.61	0.0001

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-2.72107078	-3.49	0.0050	0.77917414
FLTHR	4.22470344	22.24	0.0001	0.18976068

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	1.00000000	-0.80305542	1.80305542	-2.35440363	0.74827279
2	2.00000000	1.22902694	0.77097306	-0.15439638	2.61435026
3	3.00000000	3.36250218	-0.36250218	2.14657649	4.58497787
4	6.00000000	5.68608907	0.31391093	4.62166136	6.75051678
5	8.00000000	8.13641707	-0.13641707	7.20550270	9.06733143
6	9.00000000	10.24876879	-1.24876879	9.39358497	11.16395261
7	11.00000000	12.53010865	-1.53010865	11.70331888	13.35680642
8	14.00000000	14.93818961	-0.93818961	14.07594874	15.80043048
9	16.00000000	16.75481209	-0.75481209	15.87534275	17.63428143
10	19.00000000	19.07839099	-0.07839099	18.92378789	20.23301069
11	20.00000000	21.31749181	-1.31749181	20.11259984	22.52225558
12	23.00000000	23.47209857	0.52790943	22.10633116	24.83984997
13	26.00000000	26.04915967	2.95084033	24.47656771	27.62765162

SUM OF RESIDUALS -0.00000000
SUM OF SQUARED RESIDUALS 20.17264094
SUM OF SQUARED RESIDUALS - ERROR SS -0.00000000
PRESS STATISTIC 33.52555936
FIRST ORDER AUTOCORRELATION 0.39752207
DURBIN-WATSON D 0.79214961

CH-47 CUM. ACTUAL & FRED. CLASS A INCIDENTS 1974-1988   10:01 FRIDAY, APRIL

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

AINC
25.0 +
22.5 +
20.0 +
17.5 +
15.0 +
12.5 +
10.0 +
 7.5 +
 5.0 +
 2.5 +
 0.0 +
-2.5 +
     +----+----+----+----+----+----+----+----+----+----+----+----+----+----+--
    0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.

                                    FLTHR

CH-47 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1974-1988   10:51 FRIDAY, APRIL 1989

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

BINC |
  30 +
     |
  27 +   B
     | *
  24 +
     |
  21 +   B *
     |
  18 +   * B
     |
  15 +   * B
     | * B
  12 +   * B
     | * B
   9 +   * B
     | * B
   6 +   *
     | *
   3 +   *
     | B *
   0 +   * B *
     | B   *
  -3 +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--
    0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5

                              FLTHR

*CH-54 LINEAR FIT
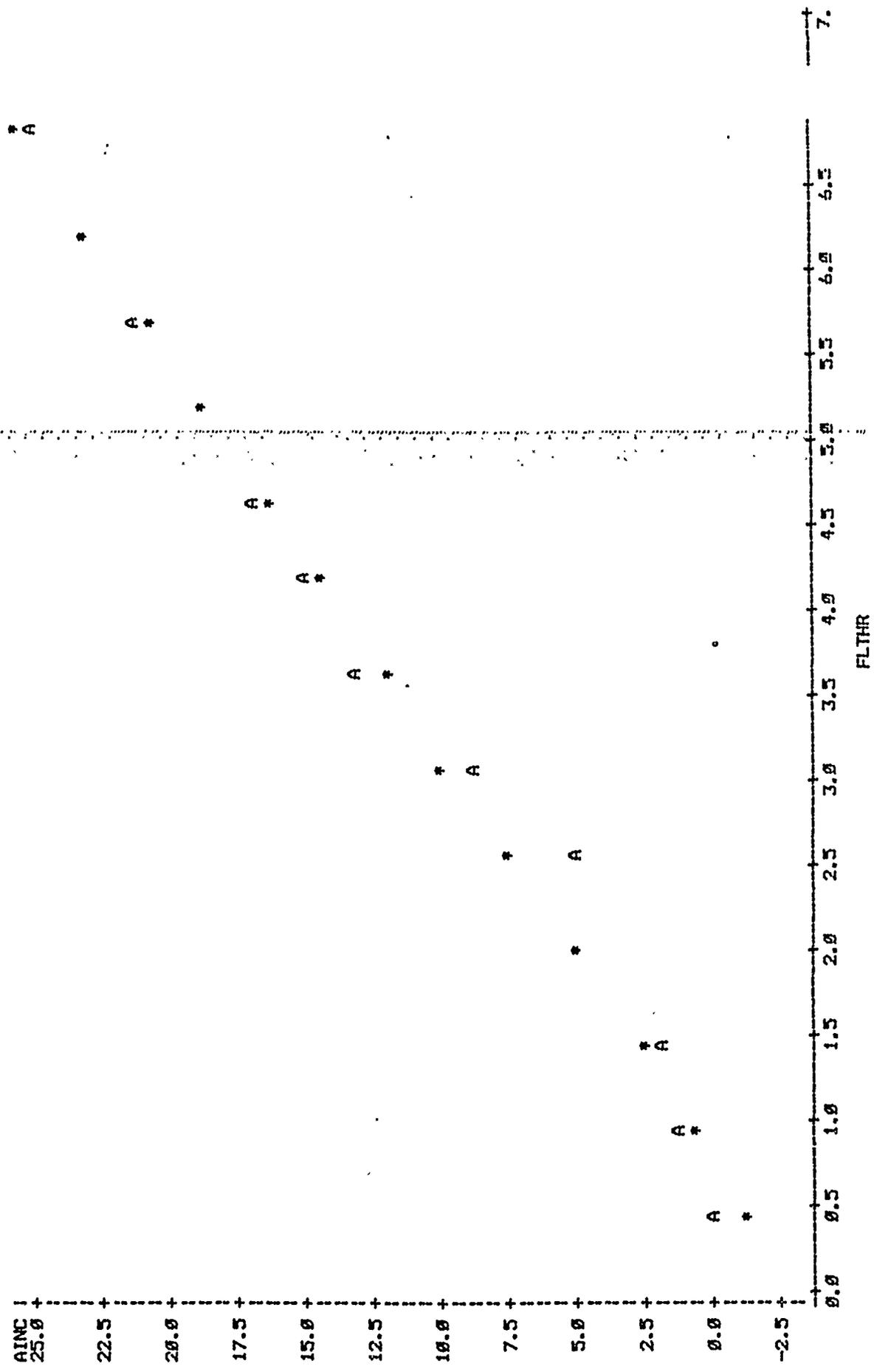
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	14.63677567	14.63677567	70.42	0.0001	0.864930
ERROR	11	2.28630125	0.20784557		ROOT MSE	AINC
CORRECTED TOTAL	12	16.92307692			0.45590293	.9230

SOURCE	DF	TYPE I SS	F VALUE	PR > F	TYPE III SS	F VALUE	PR
FLTHR	1	14.63677567	70.42	0.0001	14.63677567	70.	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-0.17533538	-0.63	0.5443	0.28020791
FLTHR	3.87106001	8.39	0.0001	0.46129376

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	0.14596260	-0.14596260	-0.39653417	0.68882938
2	0.00000000	0.49048695	-0.49048695	0.05290426	0.92806963
3	1.00000000	0.80404281	0.19595719	0.39557361	1.20851269
4	1.00000000	1.11759867	-0.11759867	0.76619372	1.46700362
5	1.00000000	1.45438089	-0.45438089	1.15613725	1.75862452
6	2.00000000	1.69825767	0.30174233	1.41377678	1.99273806
7	2.00000000	1.92665021	0.07334979	1.64634539	2.20495453
8	2.00000000	2.16665393	-0.83334407	1.98111461	2.42219725
9	3.00000000	2.43375907	0.56624093	2.12490166	2.74261649
10	3.00000000	2.72021751	0.27978249	2.37213042	3.06799449
11	3.00000000	3.02216019	-0.02216019	2.62147192	3.42204846
12	3.00000000	3.34345817	-0.34345817	2.87644475	3.85347169
13	3.00000000	3.67636933	-0.67636933	3.13685754	4.21368113

SUM OF RESIDUALS   0.00000000

SUM OF SQUARED RESIDUALS   2.28630125

SUM OF SQUARED RESIDUALS - ERROR SS -0.00000000

PRESS STATISTIC   3.27853696

FIRST ORDER AUTOCORRELATION 0.33692341

DURBIN-WATSON D   1.07674045

*GH-54 LINEAR FIT   10:51 FRIDAY, APRIL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	1.75611497	1.75611497	19.07	0.0011	0.634153
ERROR	11	1.01311580	0.09210144		ROOT MSE	BINC
CORRECTED TOTAL	12	2.76923077			0.30348218	0.3676

SOURCE	DF	TYPE I SS	F VALUE	PR > F	TYPE III SS	DF	F VAL
FLTHR	1	1.75611497	19.07	0.0011	1.75611497	1	19.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE	PR
INTERCEPT	-0.41915734	-2.25	0.0461	0.18652755	3.
FLTHR	1.34086072	4.37	0.0011	0.30767213	

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	-0.30786591	0.30786591	-0.66723922	0.05350741
2	0.00000000	-0.18852930	0.18852930	-0.49778781	0.12272921
3	0.00000000	-0.07991958	0.07991958	-0.34916477	0.19732568
4	0.00000000	0.02869014	-0.02869014	-0.20790631	0.26529059
5	0.00000000	0.14534562	-0.14534562	-0.05718263	0.34787265
6	0.00000000	0.22981924	-0.22981924	0.04644718	0.41919131
7	0.00000000	0.30893003	-0.30893003	0.12256956	0.47441059
8	0.00000000	0.39206339	-0.39206339	0.20158642	0.58214136
9	0.00000000	0.48458278	-0.48458278	0.27698305	0.69019171
10	1.00000000	0.58380647	0.41619353	0.35259529	0.81551765
11	1.00000000	0.68839361	0.31169637	0.42156510	0.95212212
12	1.00000000	0.79968505	0.20931495	0.49613483	1.16723327
13	1.00000000	0.91499707	0.08500093	0.55719644	1.27285778

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   1.01311580
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   1.36680674
FIRST ORDER AUTOCORRELATION   0.47150273
DURBIN-WATSON D   0.91636854

CH-54 CUM. ACTUAL & FRED. ...SS A INCIDENTS 1974-1988   10:51 FRIDAY, APRIL

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

AINC
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

FLTHR

CH-54 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1979-1988   10:51 FRIDAY, APRIL 22, 1988

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

```
BINC |
 1.0 +                                                              B      B                B
     |                                    *                         *           *
 0.9 +
     |
 0.8 +
     |
 0.7 +
     |
 0.6 +
     |
 0.5 +
     |
 0.4 +
     |
 0.3 +
     |
 0.2 +
     |
 0.1 +
     |
 0.0 +
     |
-0.1 +
     |
-0.2 +
     |
-0.3 +
     |
-0.4 +
     |
-0.5 +
     +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
    0.0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.
                                 FLTHR
```

OH-6 LINEAR FIT
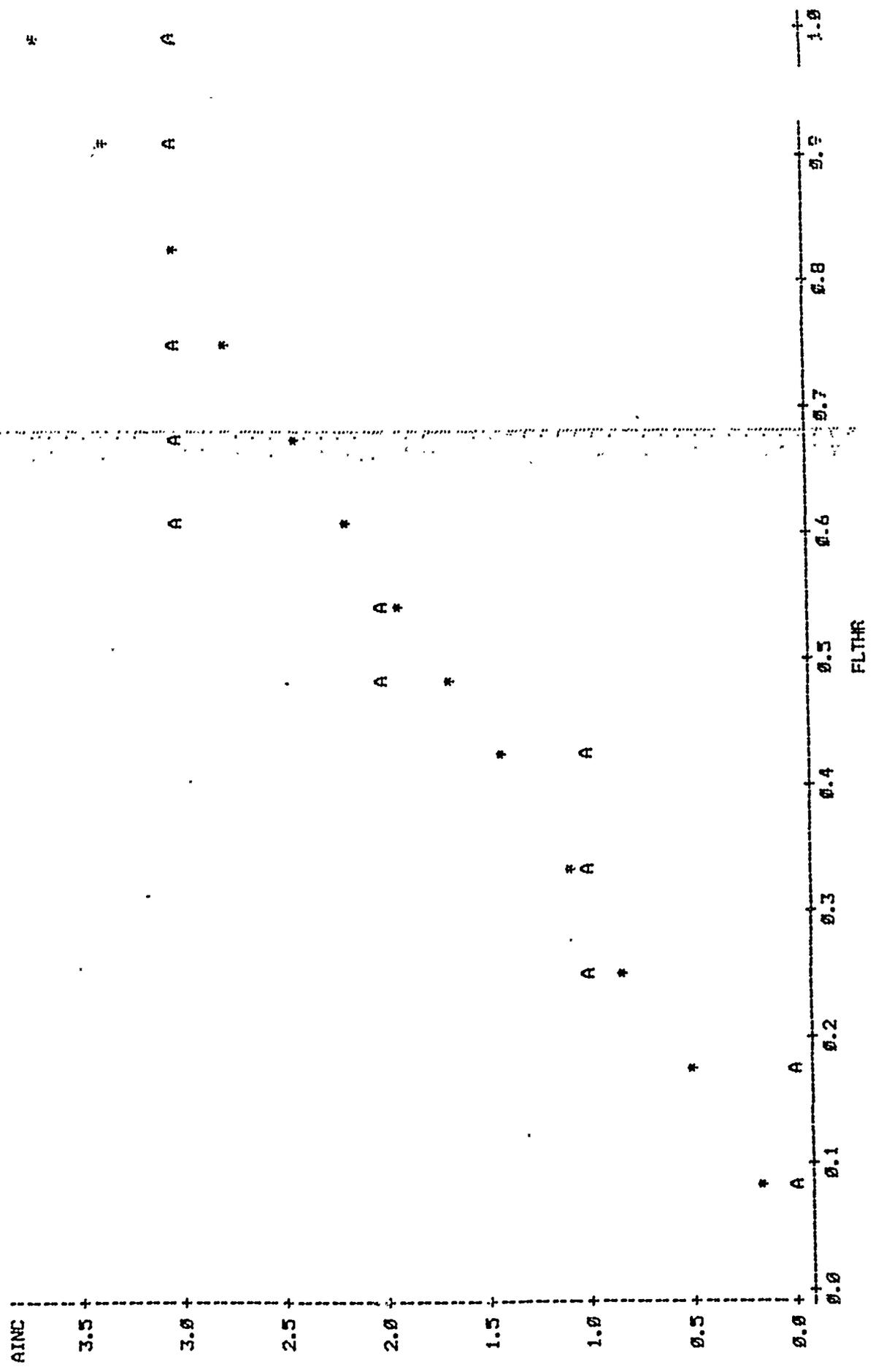
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	99.39306912	99.39306912	309.72	0.0001	0.965752
ERROR	11	3.53000780	0.32090780		ROOT MSE	AINC
CORRECTED TOTAL	12	102.92307692			0.56648991	1.9230

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE
FLTHR	1	99.39306912	309.72	0.0001	1	99.39306912	309.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	3.65510950	10.81	0.0001	0.33806273
FLTHR	2.34211958	17.69	0.0001	0.13208298

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	4.00000000	4.36242961	-0.36242961	3.69541379	5.02944543
2	5.00000000	5.14469755	-0.14469755	4.55013939	5.73925571
3	5.00000000	5.97849212	-0.97849212	5.47331726	6.48366698
4	8.00000000	6.74670734	1.25329266	6.30642777	7.18679692
5	8.00000000	7.42592202	0.57407798	7.03257401	7.81917003
6	8.00000000	8.19882148	-0.19882148	7.84134484	8.55629813
7	9.00000000	8.97172095	0.02827905	8.62585661	9.31758528
8	9.00000000	9.07488399	0.18511601	9.45153193	10.17823666
9	10.00000000	10.3462585	0.36537415	10.22792711	11.04132458
10	11.00000000	11.26699813	-0.26699813	10.81355914	11.72693713
11	11.00000000	11.85252803	0.14747197	11.34673123	12.35632483
12	12.00000000	12.43805792	-0.43805792	11.87874489	12.99737095
13	13.00000000	13.16411499	-0.16411499	12.53594013	13.79728984

SUM OF RESIDUALS   0.00000000
SUM OF SQUARED RESIDUALS   3.53000780
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   4.85905431
FIRST ORDER AUTOCORRELATION   -0.13862563
DURBIN-WATSON D   2.23241029

OH-6 LINEAR FIT

10:01 FRIDAY, APRIL ...787

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	2.45875083	2.45875083	35.03	0.0001	0.761042
ERROR	11	0.77201841	0.07018349		ROOT MSE	BINC
CORRECTED TOTAL	12	3.23076923			0.26492157	1.4615

SOURCE	DF	TYPE I SS	F VALUE	PR > F		DF	TYPE III SS	F VAL	PR
FLTHR	1	2.45875083	35.03	0.0001		1	2.45875083	35.	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > ITI	STD ERROR OF ESTIMATE
INTERCEPT	-0.36701835	-2.32	0.0405	0.15807697
FLTHR	0.36837341	5.92	0.0001	0.06223698

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	-0.25576958	0.25576958	-0.56770315	0.05616440
2	0.00000000	-0.13273286	0.13273286	-0.40657232	0.14110649
3	0.00000000	-0.00159192	0.00159192	-0.23783770	0.23465585
4	0.00000000	0.11923455	-0.11923455	-0.08657105	0.32504015
5	0.00000000	0.22606284	-0.22606284	0.04215827	0.40996742
6	0.00000000	0.34762607	-0.34762607	0.18645817	0.51488397
7	0.00000000	0.46918929	-0.46918929	0.30744395	0.63093463
8	1.00000000	0.60180372	0.39819628	0.43158915	0.77172729
9	1.00000000	0.73073441	0.26926559	0.54653754	0.92092929
10	1.00000000	0.63019524	0.15980476	0.61018579	1.04226168
11	1.00000000	0.92228859	0.07771141	0.68438527	1.15769188
12	1.00000000	1.01438194	-0.01438194	0.75231615	1.27594773
13	1.00000000	1.12857778	-0.12857778	0.83247582	1.42463537

SUM OF RESIDUALS   0.00000000
SUM OF SQUARED RESIDUALS   0.77201841
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   0.99820168
FIRST ORDER AUTOCORRELATION   0.35612315
DURBIN-WATSON D   1.16165299

OH-6 CUM. ACTUAL & PRED, CROSS A INCIDENTS 1974-1988   10:01 FRIDAY, APRIL

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

```
AINC |
  13 +
     |
     |
  12 +                                                                          A *
     |
     |
  11 +                                                        *A      A  *
     |
     |
  10 +
     |
     |
   9 +                                                *
     |
     |                                          *A
   8 +
     |                                    A        *
     |                                 A *
   7 +                       *
     |                           A
   6 +              *
     |                          A
   5 +        *A
     |
   4 +  *A
     +--+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
     0.0  0.2  0.4  0.6  0.8  1.0  1.2  1.4  1.6  1.8  2.0  2.2  2.4  2.6  2.8  3.0  3.2  3.4  3.6  3.8  4.0

                                                FLTHR
```

OH-6 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1974-1988   10:31 FRIDAY, APRIL

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

Plot of BINC vs FLTHR (Y-axis BINC from -0.4 to 1.1; X-axis FLTHR from 0.0 to 4.)

*OH-58 LINEAR FIT   10:31 FRIDAY, APRIL
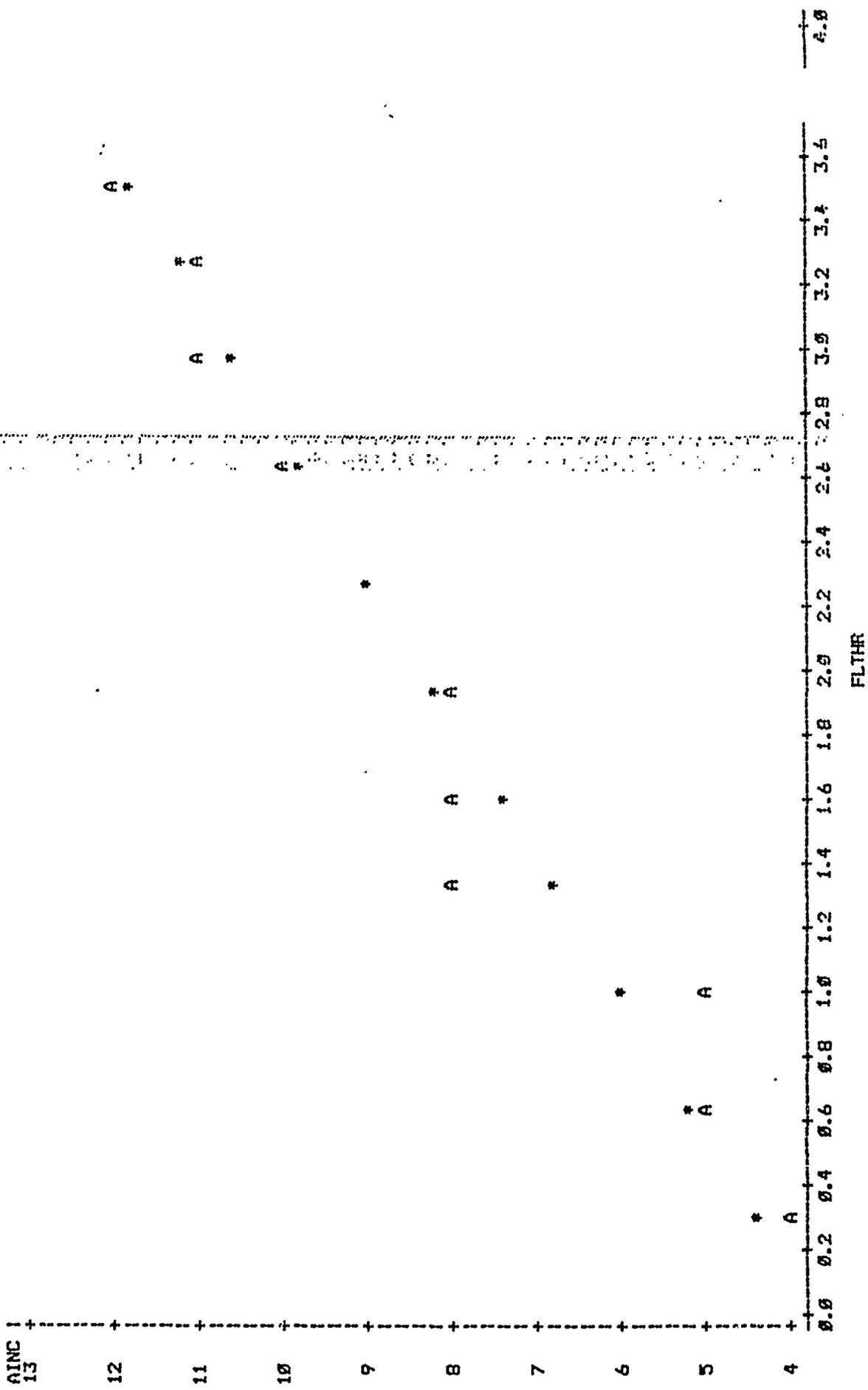
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	17943.07648916	17943.07648916	1364.82	0.0001	0.992055
ERROR	11	144.61581853	13.14689259		ROOT MSE	AINC
CORRECTED TOTAL	12	18087.69230769			3.62586439	.1538

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VAL	PR
FLTHR	1	17943.07648916	1364.82	0.0001	1	17943.07648916	1364.	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-7.54014237	-3.45	0.0054	2.18572578
FLTHR	3.43868747	36.94	0.0001	9.09307938

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	9.00000000	3.22294948	5.77705069	-1.02673137	7.47463817
2	15.00000000	14.26113616	0.73886384	10.55599382	17.96717851
3	27.00000000	24.33649044	2.66350956	21.09293629	27.53992059
4	33.00000000	34.75571346	-1.75571346	31.93317148	37.57825544
5	40.00000000	45.07177586	-5.07177586	42.58349046	47.55085127
6	50.00000000	54.70010077	-4.70010077	52.41617008	56.99403145
7	61.00000000	64.32842567	-3.32842567	62.11550761	66.54164373
8	74.00000000	74.98835682	-0.98835682	72.68276105	77.29395259
9	82.00000000	84.61668172	-2.61668172	82.08975209	87.14361175
10	98.00000000	94.24590663	3.75492337	91.39665976	97.09333359
11	105.00000000	103.52946279	1.47053721	100.30419208	106.72473049
12	117.00000000	112.81391895	4.18608105	109.16631430	116.44152359
13	123.00000000	123.12998134	-0.12998134	118.97729187	127.28267081

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   144.61581853
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   218.19523846
FIRST ORDER AUTOCORRELATION   0.39504836
DURBIN-WATSON D   0.97900732

*OH-58 LINEAR FIT   10:51 FRIDAY, APRIL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	7.88853637	7.88853637	83.88	0.0001	0.824050
ERROR	11	1.03454055	0.09404914		ROOT MSE	BINC
CORRECTED TOTAL	12	8.92307692			0.38657432	1.9238

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VAL	PR
FLTHR	1	7.88853637	83.88	0.0001	1	7.88853637	83.	3.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-0.58017755	-3.14	0.0094	0.18426773
FLTHR	0.07210120	9.16	0.0001	0.00787256

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	-0.35450080	0.35450080	-0.71416646	0.00516485
2	0.00000000	-0.12305597	0.12305597	-0.43651171	0.17039978
3	0.00000000	0.08820054	-0.08820054	-0.18621475	0.35261583
4	0.00000000	0.30666716	-0.30666716	0.06773756	0.54559676
5	0.00000000	0.52297075	-0.52297075	0.31251245	0.73343965
6	0.00000000	0.72485410	0.27514590	0.53158005	0.91802814
7	1.00000000	0.92673745	0.07326255	0.73592733	1.11394755
8	1.00000000	1.15025115	-0.15025115	0.95524468	1.34525762
9	1.00000000	1.35213450	-0.35213450	1.13849769	1.56565131
10	2.00000000	1.55401785	0.44598215	1.31310568	1.79493002
11	2.00000000	1.74669108	0.25130892	1.47597998	2.02143363
12	2.00000000	1.94336431	0.05663569	1.63456811	2.23185069
13	2.00000000	2.15966789	-0.15966789	1.80243489	2.51099909

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   1.03454055
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   1.41984.3
FIRST ORDER AUTOCORRELATION   0.07527371
DURBIN-WATSON D   1.6632749l

OH-58 CUM. ACTUAL & FRED. BLISS A INCIDENTS 1974-1988   10:51 FRIDAY, APRIL

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

```
AINC |
 150 +
     |
 140 +
     |
 130 +
     |
 120 +                                                                        A *
     |
 110 +                                                    A *
     |
 100 +                                          A *
     |
  90 +
     |
  80 +
     |
  70 +
     |
  60 +                                  * A
     |                              * A
  50 +                      * A
     |
  40 +              * A
     |
  30 +          *
     |      A *
  20 +
     |  A *
  10 +
     |  A  *
   0 +--+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
      0    2    4    6    8   10   12   14   16   18   20   22   24   26   28   30   32   34   36
                                          FLTHR
```

OH-58 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1974-1988   10:01 FRIDAY, APRIL

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

```
BINC
2.25 +
     |
2.00 +                                                          B   B
     |                                                          *   *
1.75 +                                              *
     |
1.50 +
     |
1.25 +
     |
1.00 +                                        *   B
     |
0.75 +                                  B *
     |
0.50 +                          B
     |                          *
0.25 +
     |
0.00 +
     |
-0.25+
     |
-0.50+
     +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--
        2  4  6  8  10 12 14 16 18 20 22 24 26 28 30 32 34 36

                              FLTHR
```

*TH-55 LINEAR FIT   10:51 FRIDAY, APRIL
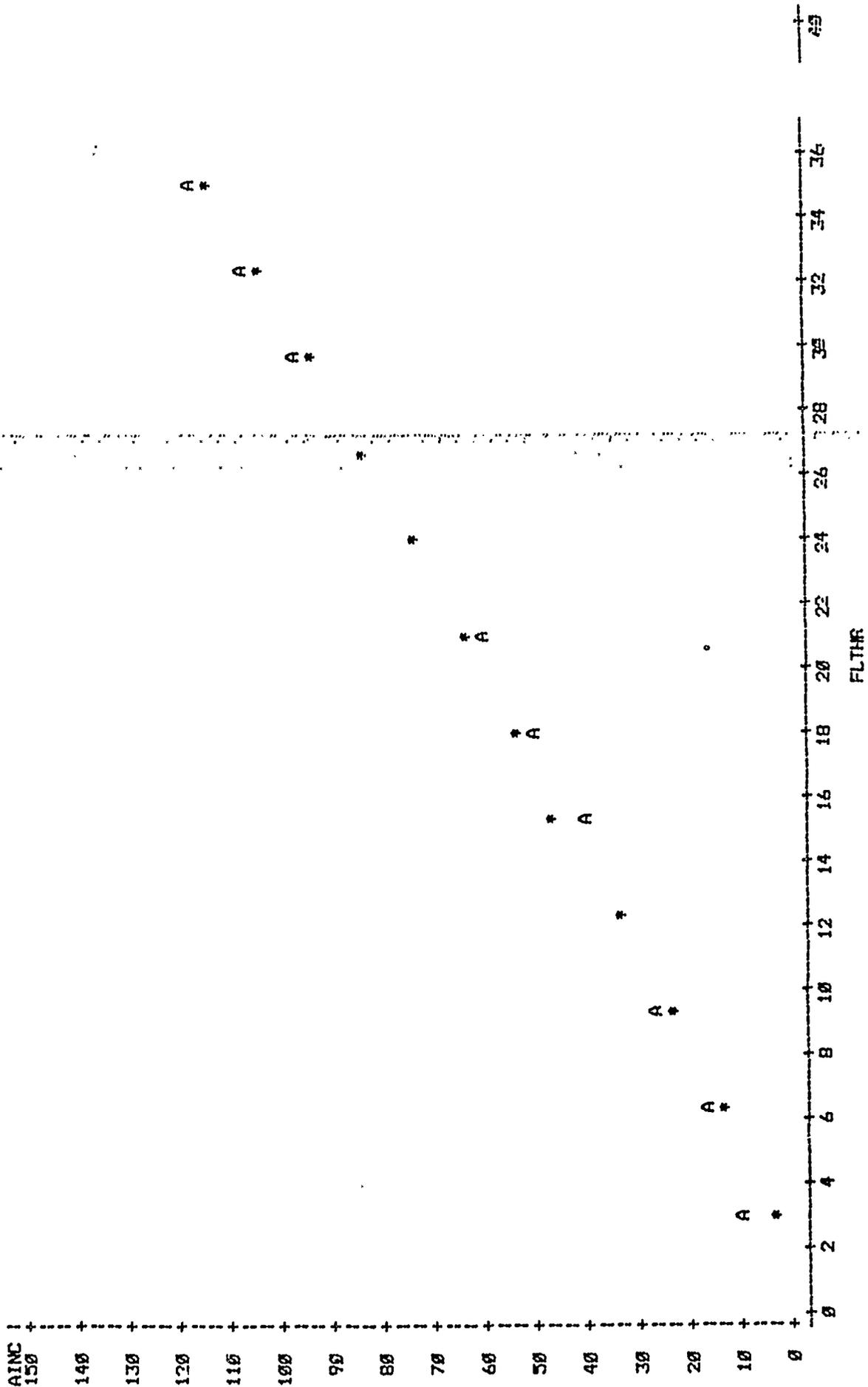
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.
MODEL	1	178.39456992	178.39456992	14.67	0.0033	0.594649	12.
ERROR	10	121.60543998	12.16054400		ROOT MSE		AINC
CORRECTED TOTAL	11	300.00000000			3.48719716		1.0030

SOURCE	DF	TYPE I SS	F VALUE	PR > F	TYPE III SS	DF	F VA
FLTHR	1	178.39456992	14.67	0.0033	178.39456992	1	14.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > ITI	STD ERROR OF ESTIMATE
INTERCEPT	20.74208440	9.67	0.0001	2.14574272
FLTHR	1.30577192	3.83	0.0033	0.34092043

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	17.00000000	22.29593299	-5.29593299	18.29629321	26.30121276
2	23.00000000	23.27528193	-0.27528193	19.72724678	26.82291767
3	26.00000000	24.35997262	1.64992738	21.27495145	27.44469389
4	20.00000000	25.20782437	-5.20782437	22.43843394	27.97721481
5	31.00000000	25.91294121	5.08705879	23.36241212	28.46347039
6	31.00000000	26.80086612	4.19913388	24.45188477	29.14984746
7	31.00000000	28.11969576	2.88030424	25.87520699	30.36378423
8	31.00000000	29.41240996	1.58759004	27.02554275	31.83117719
9	31.00000000	30.75735504	0.24264496	27.99979688	33.51491329
10	31.00000000	32.03701153	-1.03701153	28.78946773	35.28455533
11	32.00000000	33.23832169	-1.23832169	29.45448111	37.02215228
12	32.00000000	34.58326677	-2.58326677	30.14550288	39.02153067

SUM OF RESIDUALS   0.00000000
SUM OF SQUARED RESIDUALS   121.60543998
SUM OF SQUARED RESIDUALS - ERROR SS   0.00000000
PRESS STATISTIC   177.32972975
FIRST ORDER AUTOCORRELATION   0.07083099
DURBIN-WATSON D   1.57282149

TH-55 CUM. ACTUAL & PRED. CLASS A INCIDENTS 1974-1988   10:01 FRIDAY, APRIL

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

```
AINC
  34 -+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+----
        *              A                                                                              A    *
  32                   A                        A                      *              A             A
                                                                                      A
  30
                                                       A        *
  28                                                   A        A+*
                                              *
  26                           A        A
                     A              *.
  24                        *
                       *
  22       *                          A
  20                                                                          A
  18
  16 A
     -+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+----
      1         2         3         4         5         6         7         8         9        10

                                              FLTHR
```

*UH-60 LINEAR FIT

10:51 FRIDAY, APRIL
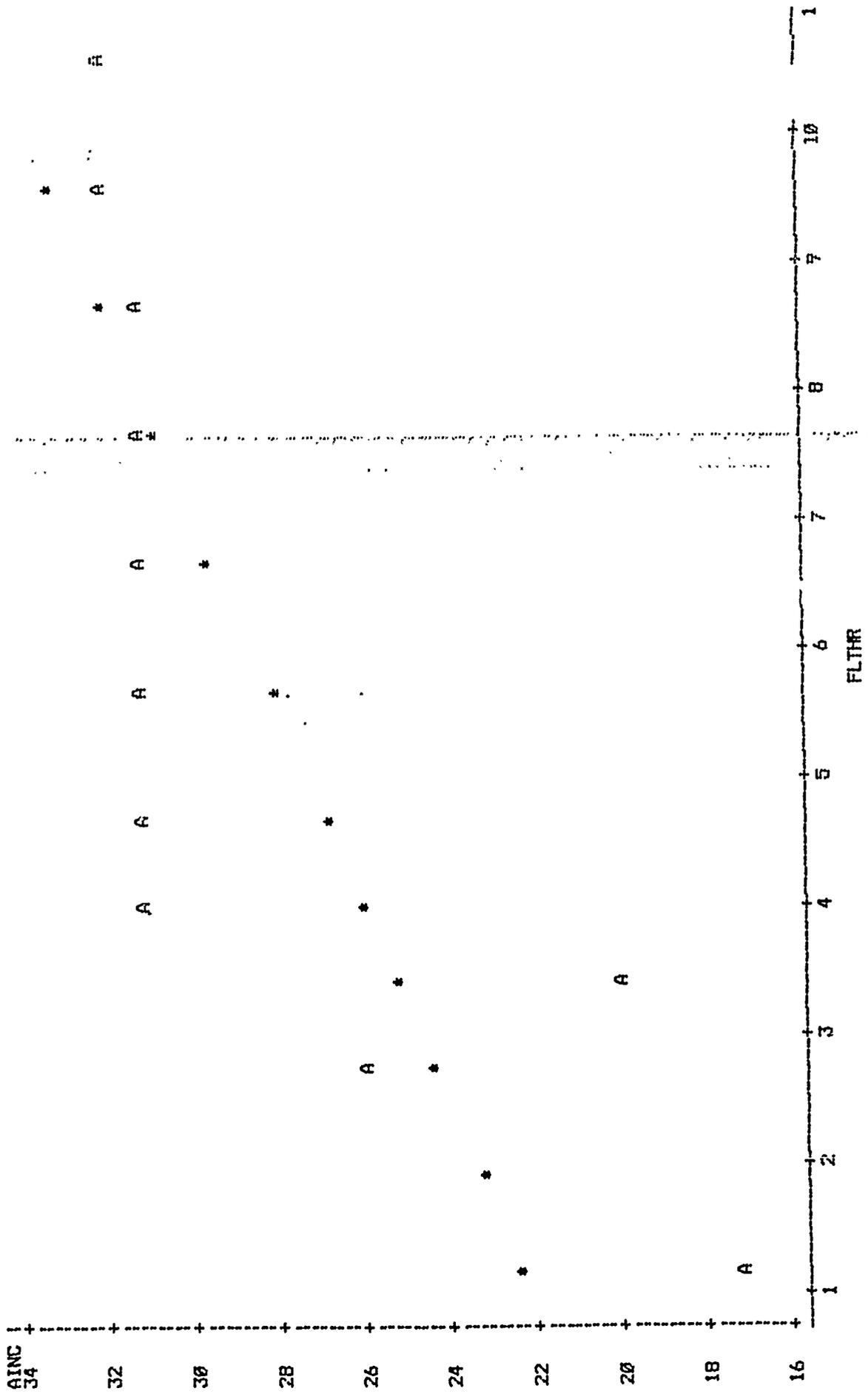
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	795.21055469	795.21055469	169.76	0.0001	0.9603379	23.
ERROR	7	32.78944531	4.68420647			ROOT MSE	AINC MEAN
CORRECTED TOTAL	8	828.00000000				2.16439277	1.6656

SOURCE	DF	TYPE I SS	F VALUE	PR > F		SOURCE	DF	TYPE III SS	F VALUE	PR > F
FLTHR	1	795.21055469	169.76	0.0001		FLTHR	1	795.21055469	169.76	0.0001

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-0.79950701	-0.70	0.5050	1.13774244
FLTHR	5.13053411	13.03	0.0001	0.39376719

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	-0.61489778	0.61489778	-3.27979756	2.05018199
2	0.00000000	0.54982346	-0.54982346	-1.95843680	3.05608373
3	1.00000000	2.61229817	-1.61229817	0.36575261	4.88083674
4	4.00000000	5.45974460	-1.45974460	3.50956399	7.45992522
5	9.00000000	8.94850780	0.05149220	7.21430078	10.65278662
6	14.00000000	13.00162775	0.99837025	11.24355055	14.75745894
7	21.00000000	17.00344635	3.99655365	14.74697978	19.05082192
8	21.00000000	19.97915614	1.02084386	17.57778176	22.33993031
9	26.00000000	29.06020151	-3.06020151	25.31139408	32.85905894

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   32.78944531
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   77.46405014
FIRST ORDER AUTOCORRELATION   0.23861763
DURBIN-WATSON D   1.22563188

*UH-60 LINEAR FIT   10:01 FRIDAY, APRIL ...

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	96.87877384	96.87877384	92.35	0.0001	0.929540
ERROR	7	7.34344838	1.04906405		ROOT MSE	BINC
CORRECTED TOTAL	8	104.22222222			1.02423828	.4444

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VAL
FLTHR	1	96.87877384	92.35	0.0001	1	96.87877384	92.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	0.44230916	0.82	0.4385	0.53852179
FLTHR	1.79075358	9.61	0.0001	5.18644705

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	0.50677629	-0.50677629	-0.75440795	1.76796053
2	0.00000000	0.91327736	-0.91327736	-0.27278946	2.09934418
3	1.00000000	1.63316039	-0.63316039	0.57630461	2.69631598
4	3.00000000	2.62702853	0.37297147	1.70412178	3.54993528
5	5.00000000	3.84474097	1.15525903	3.02494380	4.65543613
6	7.00000000	5.25943630	1.74056370	4.42738192	6.09122068
7	7.00000000	6.65622409	0.34377591	5.68258822	7.62985996
8	7.00000000	7.69486117	-0.69486117	6.55643932	8.83129152
9	10.00000000	10.86449500	-0.86449500	9.09440307	12.63855693

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   7.34344838
SUM OF SQUARED RESIDUALS - ERROR SS   0.00000000
PRESS STATISTIC   12.77152958
FIRST ORDER AUTOCORRELATION   0.57286431
DURBIN-WATSON D   0.71752729

UH-60 CUM. ACTUAL & PRED. CLASS A INCIDENTS 1977-1988   10:01 FRIDAY, APRIL

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

AINC |
  30 +
     |
  27 +
     |
  24 +
     |
  21 +   A
     |
  18 +   *
     |
  15 +
     |
  12 +   A   *
     |
   9 +   *
     |
   6 +   *   A
     |
   3 +   *   A
     |
   0 +   A *
     |
  -3 +
     +----+----+----+----+----+----+----+----+----+----+----+----+----+
        0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0
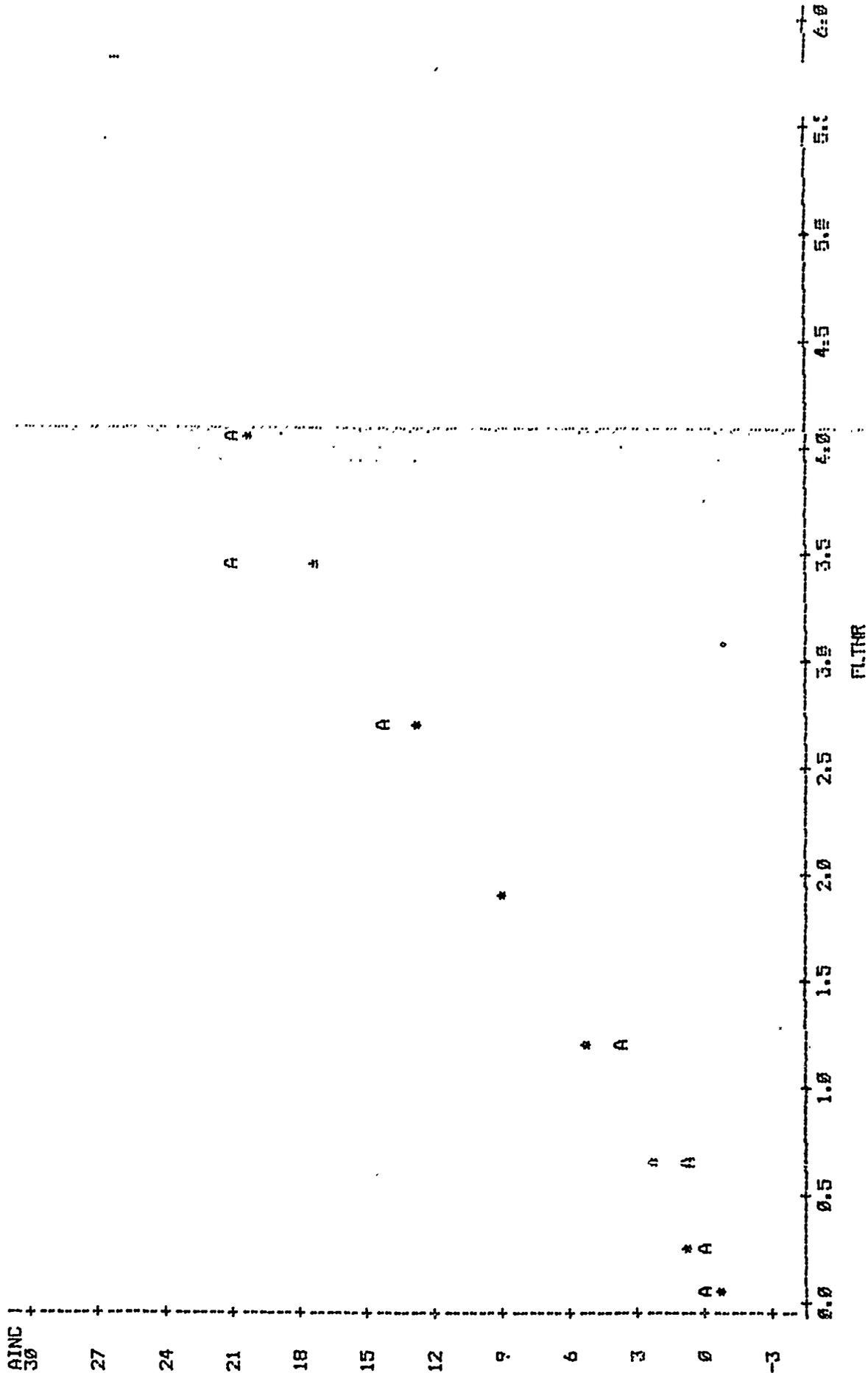
                                    FLTHR

UH-60 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1977-1983   10:51 FRIDAY, APRIL
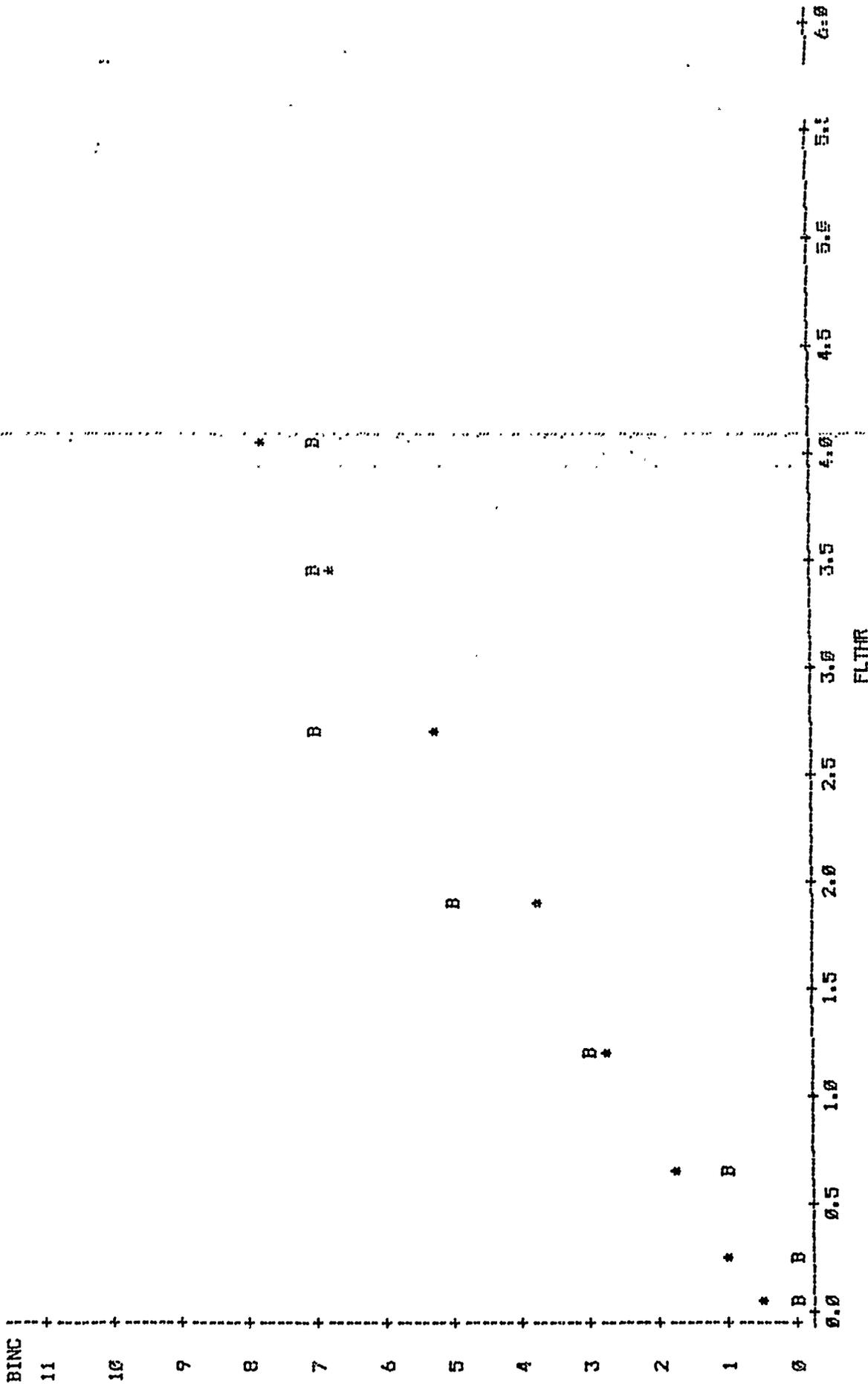
PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

BINC

1988 C-12 CLASS B ACCIDENT CRASH DAMAGE FACTOR REPORT   10:51 FRIDAY, APRIL   1987

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	8.26541247	8.26541247	54.26	0.0001	0.857731
ERROR	9	1.37095117	0.15232791		ROOT MSE	BINC
CORRECTED TOTAL	10	9.63636364			5.39027258	1.8181

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VAL	PR
FLTHR	1	8.26541247	54.26	0.0001	1	8.26541247	54.	5.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-0.22773622	-1.23	0.2481	0.18441594
FLTHR	0.55839150	7.37	0.0001	0.07582472

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	-0.22326909	0.22326909	-0.63939310	0.17285493
2	0.00000000	-0.16910511	0.16910511	-0.57258466	0.23437444
3	0.00000000	0.05351807	0.05351807	-0.43155910	0.32401395
4	0.00000000	0.12349263	-0.12349263	...	0.44446932
5	0.00000000	0.36974268	-0.36974268	0.21735425	0.44465298
6	0.00000000	0.64893843	-0.64893843	0.87662238	0.66794298
7	0.00000000	0.97838742	0.02161058	0.37770475	0.92817211
8	1.00000000	0.31900323	0.69099177	0.70707378	1.24715565
9	2.00000000	1.65962704	0.34037296	1.81156635	1.62645318
10	2.00000000	1.97791020	0.02208980	1.20662647	2.03062842
11	2.00000000	2.36878424	-0.36878424	1.53326848	2.42255961
				1.92233175	2.91443674

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   1.37095117
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   1.97028375
FIRST ORDER AUTOCORRELATION   0.49676429
DURBIN-WATSON D   1.05098013

C-12 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1975-1989   10:31 FRIDAY, APRIL

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

```
BINC
 2.25 +                                                          *
      |
 2.00 +                                    B           B                    B
      |
 1.75 +
      |
 1.50 +
      |
 1.25 +
      |
 1.00 +
      |
 0.75 +
      |
 0.50 +
      |
 0.25 +
      |
 0.00 +B  B    B
      |
-0.25 +              *
      |
-0.50 +
      +----+----+----+----+----+----+----+----+----+----+----
      0.0  0.4  0.8  1.2  1.6  2.0  2.4  2.8  3.2  3.6   4
                              FLTHR
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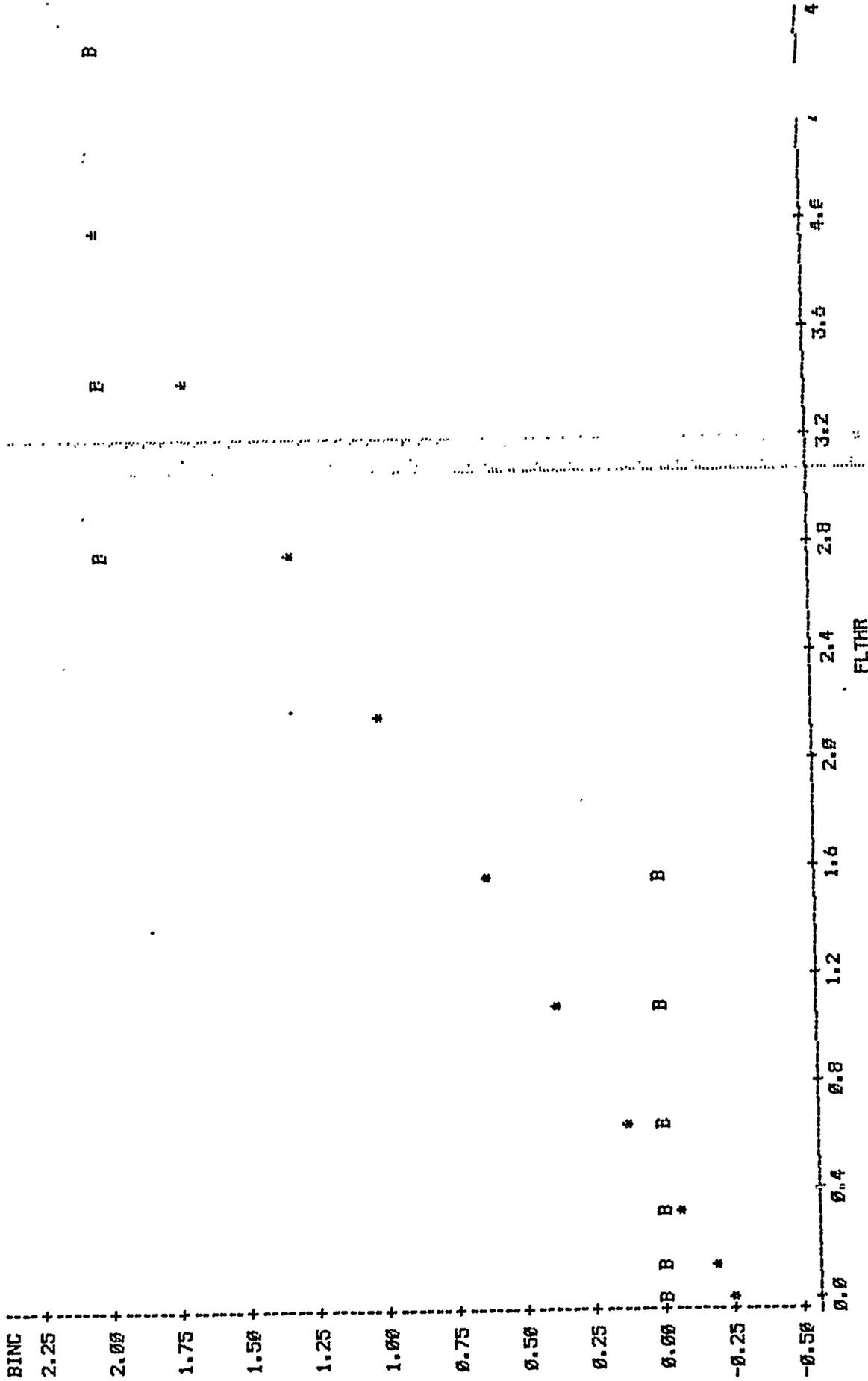
T-42 1988 PTR...FACTOR REPORT

10:12 FRIDAY, APRIL 1, 1...789

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	
MODEL	1	40.32553110	40.32553110	87.83	0.0001	0.897785	19.
ERROR	10	4.59113557	0.45911356		ROOT MSE		AINC
CORRECTED TOTAL	11	44.91666667			0.67757919		.4166

SOURCE	DF	TYPE I SS	F VALUE	PR > F		TYPE III SS	DF	F VALUE	PR
FLTHR	1	40.32553110	87.83	0.0001		40.32553110	1	87.83	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > !T!	STD ERROR OF ESTIMATE
INTERCEPT	-0.45768329	-1.00	0.3405	0.45733768
FLTHR	2.55269310	9.37	0.0001	0.27237586

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	0.21112230	-0.21112230	-0.66690408	1.08904869
2	0.00000000	0.88503328	-0.88503328	0.14192172	1.62814485
3	1.00000000	1.57170773	-0.57170773	0.95336746	2.19004799
4	3.00000000	2.22264447	0.77735553	1.70251897	2.74276996
5	4.00000000	2.78423695	1.21576305	2.32320221	3.24527169
6	4.00000000	3.32030250	0.67969750	2.88307346	3.75673154
7	4.00000000	3.85636805	0.14363195	3.40817886	4.30455724
8	4.00000000	4.31585281	-0.31585281	3.83041817	4.80128745
9	5.00000000	4.82639143	0.17360857	4.27659495	5.37618791
10	5.00000000	5.31140312	-0.31140312	4.68461232	5.93819393
11	5.00000000	5.79641481	-0.79641481	5.08223691	6.51057271
12	6.00000000	5.89852253	0.10147747	5.16496353	6.63208154

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   4.59113557
SUM OF SQUARED RESIDUALS - ERROR SS   -0.00000000
PRESS STATISTIC   6.46454556
FIRST ORDER AUTOCORRELATION   0.46402296
DURBIN-WATSON D   1.06000272

T-42 CUM. ACTUAL & PRED. CLASS A INCIDENTS 1974-1988   10:12 FRIDAY, APRIL 1, 1989

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

```
AINC |
     |
   6 +
     |
     |
     |
   5 +                                              A *          A *      * A
     |                                          A*
     |                            A *
     |
   4 +                      A *              A*
     |                  A       *
     |            A
     |        A
   3 +            *
     |
     |      A
     |        *
   2 +
     |
     |      *
     |
   1 +    *
     |                .
     |      *
     |    *
   0 +  *A
     +--+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+--
      0.0       0.2       0.4       0.6       0.8       1.0       1.2       1.4       1.6       1.8       2.0       2.2       2.4

                                                            FLTHR
```
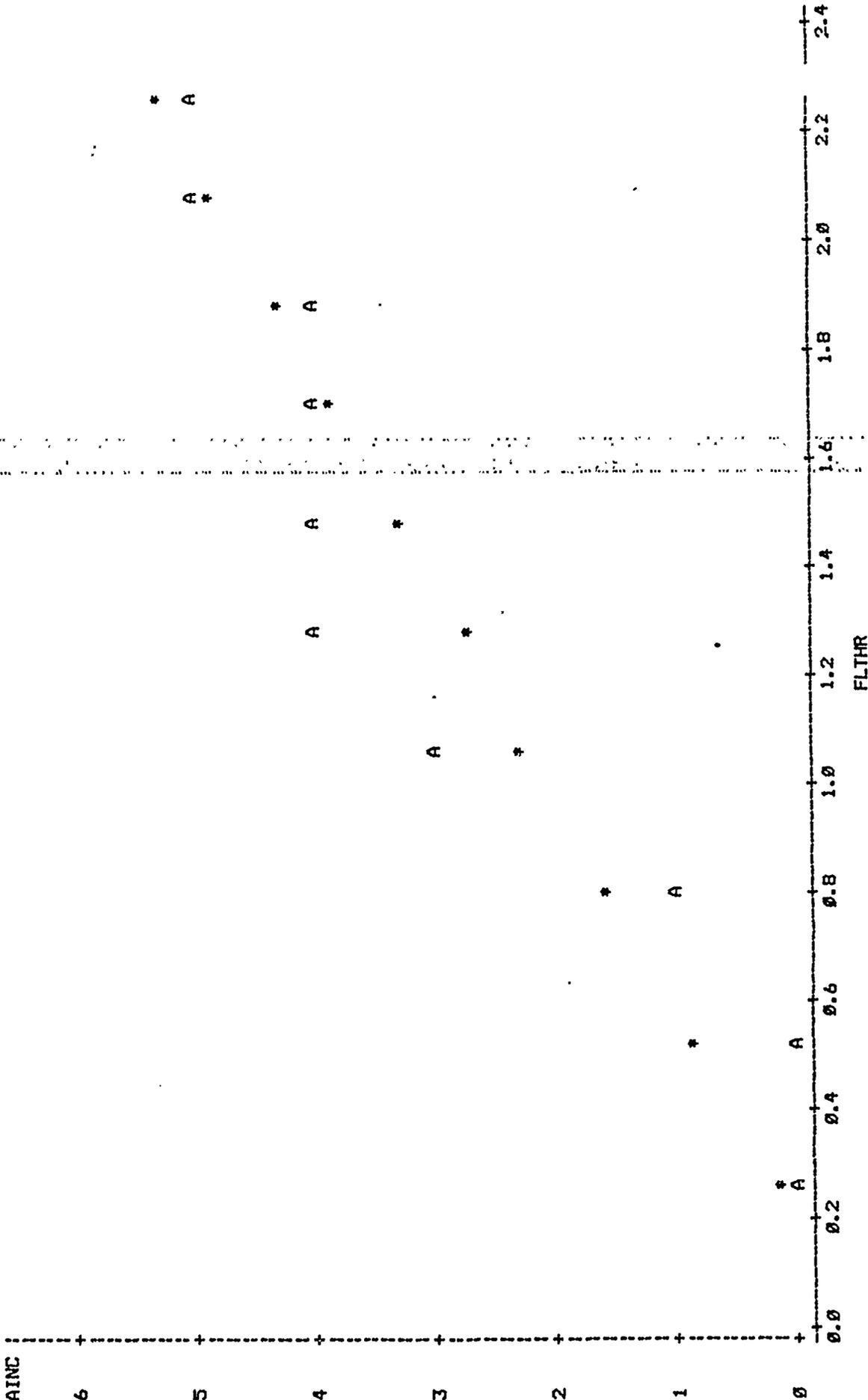
U-8 PTRF 1988 FACTOR REPORT   10:12 FRIDAY, APRIL 1, 1989

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	40.91641564	40.91641564	104.32	0.0001	0.904615
ERROR	11	4.31435359	0.39221396		ROOT MSE	AINC
CORRECTED TOTAL	12	45.23076923			0.62626988	.4615

SOURCE	DF	TYPE I SS	F VALUE	PR > F		TYPE III SS	F VALUE	PR
FLTHR	1	40.91641564	104.32	0.0001		40.91641564	104.32	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	1.66896141	3.34	0.0066	0.50034299
FLTHR	2.74223159	10.21	0.0001	0.26848304

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	2.00000000	2.69406238	-0.69406238	1.68910741	3.51901735
2	3.00000000	3.67079047	-0.67079047	2.95817602	4.38340491
3	5.00000000	4.65525161	0.34474839	4.10966522	5.20083800
4	7.00000000	5.56293026	1.43706974	5.13438175	5.99147877
5	7.00000000	6.27591048	0.72408952	5.89151965	6.66030131
6	7.00000000	6.68724522	0.31275478	6.30185988	7.07263055
7	7.00000000	6.98889069	0.01110931	6.59005449	7.38772689
8	7.00000000	7.29053616	-0.29053616	6.86855352	7.71251881
9	7.00000000	7.56475932	-0.56475932	7.11456564	8.01495301
10	8.00000000	7.86640480	0.13359520	7.37875091	8.35405869
11	8.00000000	8.11320564	-0.11320564	7.59086838	8.63554290
12	8.00000000	8.36000648	-0.36000648	7.80007514	8.91993782
13	8.00000000	8.36000648	-0.36000648	7.80007514	8.91993782

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   4.31435359
SUM OF SQUARED RESIDUALS - ERROR SS   0.00000000
PRESS STATISTIC   6.34806718
FIRST ORDER AUTOCORRELATION   0.50541032
DURBIN-WATSON D   0.87456287

U-8 CUM. ACTUAL & PRED. CLASS A INCIDENTS 1974-1988   10:12 FRIDAY, APRIL 1   1987

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

NOTE: 2 OBS HIDDEN

U-21 PTRF 1985 FACTOR REPORT   10:12 FRIDAY, AFRIL 1, 1989
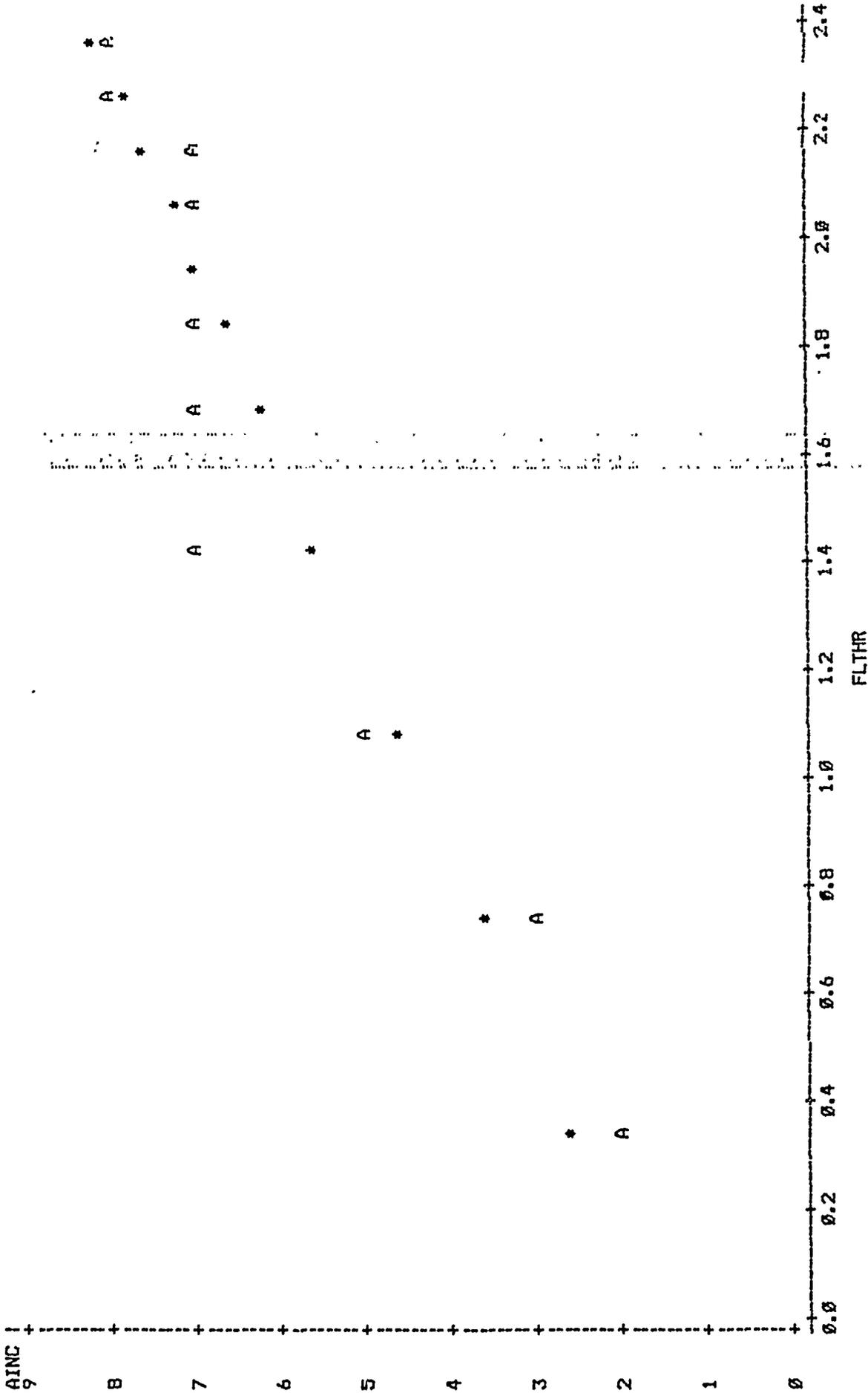
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE
MODEL	1	59.07671267	59.07671267	168.95	0.0001	0.938672
ERROR	11	3.84636426	0.34966948		ROOT MSE	AINC
CORRECTED TOTAL	12	62.92307692			0.59132857	.9238

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE
FLTHR	1	59.07671267	168.95	0.0001	1	59.07671267	168.95

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-0.00780821	-0.02	0.9823	0.34402869
FLTHR	1.10049546	13.00	0.0001	0.08466598

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	0.53693704	-0.53693704	-0.14060974	1.21448383
2	1.00000000	1.12570212	-0.12570212	0.53015174	1.72125249
3	1.00000000	1.67594985	-0.67594985	1.15145885	2.20044084
4	2.00000000	2.22619758	-0.22619758	1.76482530	2.68756985
5	4.00000000	2.77644531	1.22355469	2.36656607	3.18632454
6	4.00000000	3.29367817	0.70632183	2.91729937	3.67005698
7	4.00000000	3.85493086	0.14506914	3.49377243	4.21608928
8	4.00000000	4.41618354	-0.58381646	4.04567807	4.78668901
9	5.00000000	5.03246100	-0.03246100	4.62553161	5.43939049
10	5.00000000	5.62672855	-0.62672855	5.16464121	6.08881589
11	6.00000000	6.22099610	-0.22099610	5.69923238	6.75175981
12	7.00000000	6.78224878	0.21775122	6.17834212	7.38615545
13	7.00000000	7.43154111	-0.43154111	6.73637772	8.12670449

SUM OF RESIDUALS -0.00000000
SUM OF SQUARED RESIDUALS 3.84636426
SUM OF SQUARED RESIDUALS - ERROR SS -0.00000000
PRESS STATISTIC 5.18066833
FIRST ORDER AUTOCORRELATION 0.28020876
DURBIN-WATSON D 1.31621166

U-21 GD 1989 FACTOR REPORT   10:12 FRIDAY, APRIL 1 1789

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	26.
MODEL	1	14.87837062	14.87837062	52.43	0.0001	0.826576	
ERROR	11	3.12162938	0.28378449		ROOT MSE		BINC
CORRECTED TOTAL	12	18.00000000			0.53271427		.0000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR
FLTHR	1	14.87837062	52.43	0.0001	1	14.87837062	52.43	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	0.02730529	0.09	0.9314	0.30992751
FLTHR	0.55227805	7.24	0.0001	0.07627363

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	0.00000000	0.30068293	-0.30068293	-0.30970334	0.91106919
2	0.00000000	0.59615168	-0.59615168	0.05963409	1.13266928
3	1.00000000	0.87229071	0.12770929	0.39978888	1.34479254
4	2.00000000	1.14842773	0.85157027	0.73279009	1.56406937
5	2.00000000	1.42456876	0.57543124	1.05531801	1.79381950
6	2.00000000	1.68413944	0.31586056	1.34506846	2.02321042
7	2.00000000	1.96580124	0.03419876	1.64044195	2.29116054
8	2.00000000	2.24746305	-0.24746305	1.91368322	2.58124288
9	2.00000000	2.55673876	-0.55673876	2.19014545	2.92333266
10	2.00000000	2.85496890	-0.85496890	2.43868508	3.27125272
11	3.00000000	3.15319905	-0.15319905	2.67504626	3.63135183
12	4.00000000	3.43486085	0.56513915	2.89081527	3.97898643
13	4.00000000	3.76070490	0.23929510	3.13444824	4.38696156

SUM OF RESIDUALS	-0.00000000
SUM OF SQUARED RESIDUALS	3.12162938
SUM OF SQUARED RESIDUALS - ERROR SS	-0.00000000
PRESS STATISTIC	4.31363844
FIRST ORDER AUTOCORRELATION	0.53798523
DURBIN-WATSON D	0.87672335

U-21 CUM. ACTUAL & PRED. CLASS A INCIDENTS 1974-1988   10:12 FRIDAY, AFRIL 1   1989

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

AINC

FLTHR

0.0   0.5   1.0   1.5   2.0   2.5   3.0   3.5   4.0   4.5   5.0   5.5   6.0   6.5   7.0   7.5

U-21 CUM. ACTUAL & PRED. CLASS B INCIDENTS 1974-1988   10:12 FRIDAY, APRIL 14, 1989

PLOT OF BINC*FLTHR   SYMBOL USED IS B
PLOT OF PREDB*FLTHR   SYMBOL USED IS *

BINC |
   4 +
     |
     | B   *
     |
     | B   *
     |
     | *   B
   3 +
     |
     | *
     | B
     | *   B   B   *   B
     |
   2 +   B   B   B   B   B
     |
     | *   *   *
     |
     | B *
     | *
   1 +   *
     | *
     | *
     | B
     | *
     | B
   0 +
     ---+----------+----------+----------+----------+----------+----------+----------+----------+----------+----------+----------+----------+----------+----------+--
      0.0   0.5   1.0   1.5   2.0   2.5   3.0   3.5   4.0   4.5   5.0   5.5   6.0   6.5   7.0   7.5

                                                              FLTHR

73
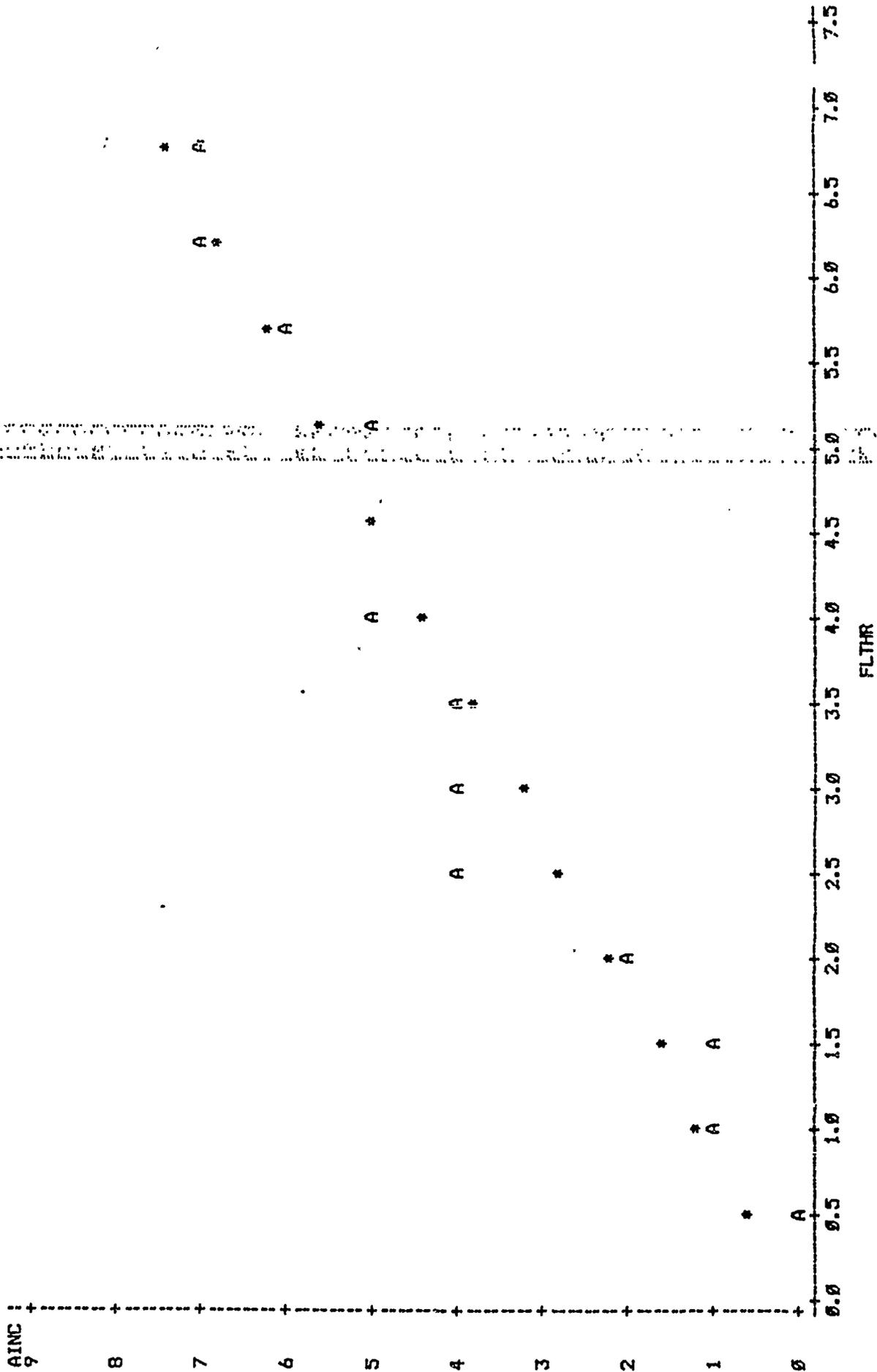
OV-1 PTRF 1985 FACTOR REPORT

10:12 FRIDAY, APRIL 14, 1989
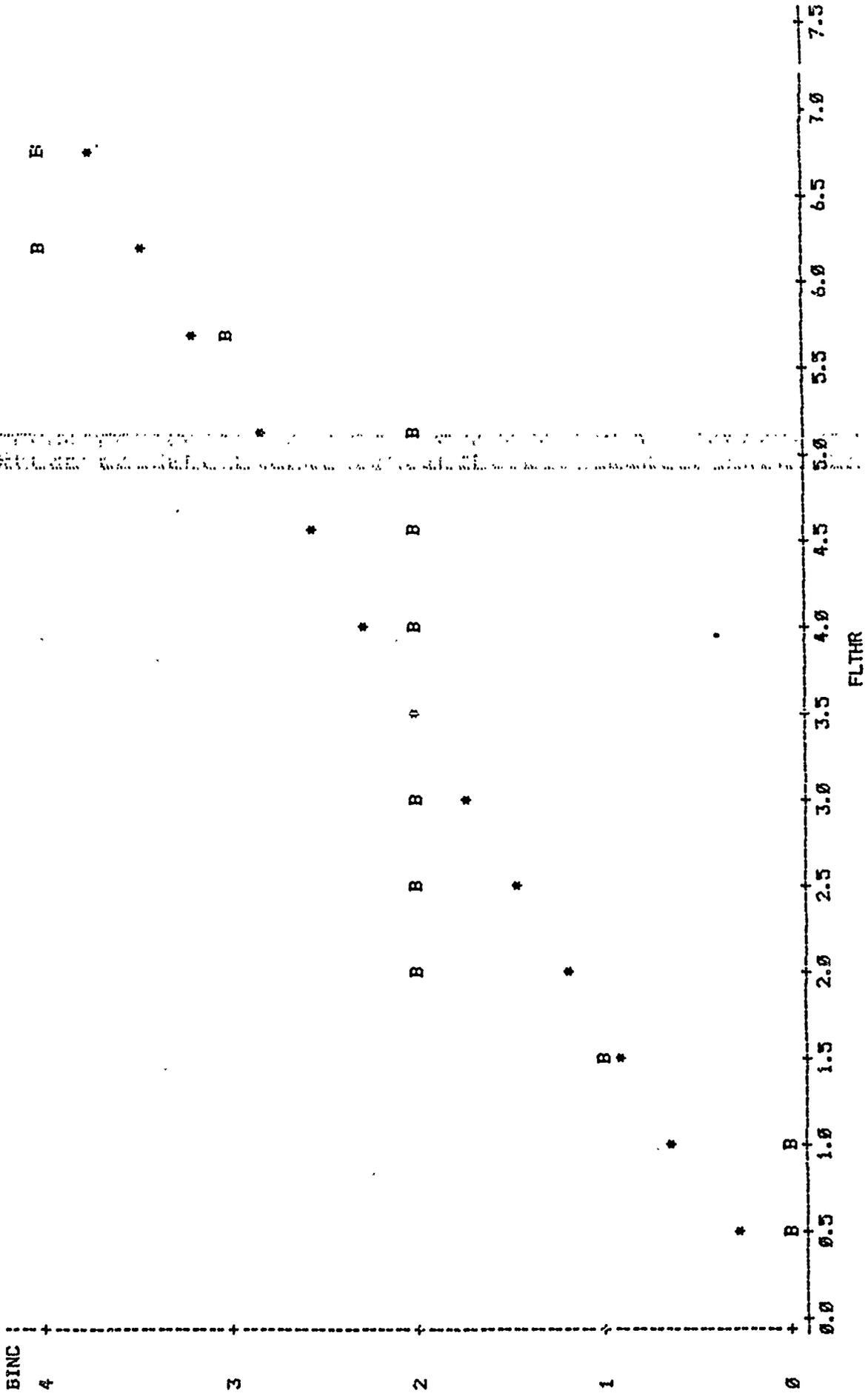
GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AINC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	
MODEL	1	442.00327198	442.00327198	638.00	0.0001	0.982229	8.
ERROR	11	7.3672802	0.72697527		ROOT MSE		AINC
CORRECTED TOTAL	12	450.00000000			0.85262845		10.0000

SOURCE	DF	TYPE I SS	F VALUE	PR > F		TYPE III SS	DF	F VALUE	PR
FLTHR	1	442.00327198	608.00	0.0001		442.00327198	1	608.00	0.

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	-1.31714031	-2.55	0.0269	0.51630817
FLTHR	7.93499941	24.66	0.0001	0.32180588

OBSERVATION	OBSERVED VALUE	PREDICTED VALUE	RESIDUAL	LOWER 95% CL FOR MEAN	UPPER 95% CL FOR MEAN
1	2.00000000	0.28572757	1.71427243	-0.72560082	1.29705996
2	2.00000000	1.85685945	0.14314055	0.96285412	2.75086479
3	3.00000000	3.57875433	-0.57875433	2.80452646	4.33298259
4	4.00000000	5.36412919	-1.36412919	4.69919406	6.02906432
5	6.00000000	7.01460907	-1.01460907	6.42987374	7.59934439
6	9.00000000	8.76030894	0.23959106	8.22819240	9.29242547
7	10.00000000	10.42665881	-0.42665881	9.90478390	10.94853373
8	12.00000000	11.93430870	0.06569130	11.38593431	12.48268390
9	14.00000000	13.44195859	0.55804141	12.83756078	14.04635639
10	16.00000000	15.02895847	0.97104153	14.34163836	15.71627858
11	16.00000000	16.53660836	-0.53660836	15.75472607	17.31849065
12	18.00000000	17.88555826	0.11444174	17.01014446	18.76097205
13	18.00000000	17.88555826	0.11444174	17.01014446	18.76097205

SUM OF RESIDUALS   -0.00000000
SUM OF SQUARED RESIDUALS   7.99672802
SUM OF SQUARED RESIDUALS - ERROR SS   0.00000000
PRESS STATISTIC   12.45023760
FIRST ORDER AUTOCORRELATION   0.24657116
DURBIN-WATSON D   1.13772921

OV-1 CUM. ACTUAL & PRED. CLASS A INCIDENTS 1974-1988   10:12 FRIDAY, APRIL 14, 1989

PLOT OF AINC*FLTHR   SYMBOL USED IS A
PLOT OF PREDA*FLTHR   SYMBOL USED IS *

AINC
18 +   *

16 +   * A

14 +   A   *

12 +   *

                                      A *

10 +

                          A *

8 +

                A *

6 +   *

            A

4 +   *
       * A

2 +
         A   *

0 +
   +---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+---------+
  0.0   0.2   0.4   0.6   0.8   1.0   1.2   1.4   1.6   1.8   2.0   2.2   2.4

                                                    FLTHR

NOTE: 2 OBS HIDDEN

75
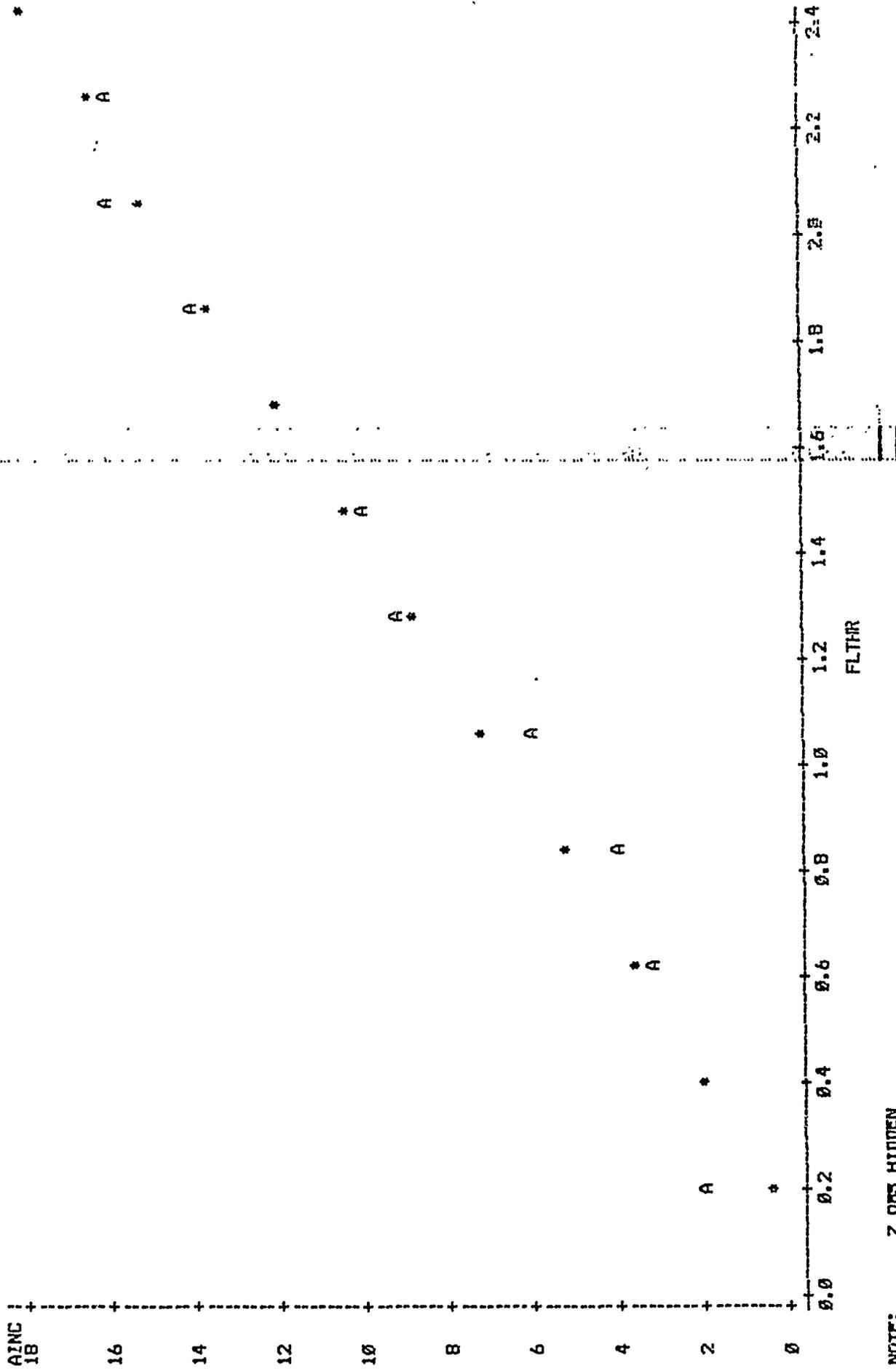
APPENDIX C

NON-LINEAR SAS OUTPUT LISTINGS

```
/*      SAS PROGRAM TO FIT A CUBIC EQUATION TO CLASS B INCIDENTS      */
/*        FOR THE UH-1 AIRCRAFT.   1989 LINEAR FIT WAS ONLY .7837 */
DATA UH1REG;
    INPUT YEAR CHOURS HOURS AINC BINC;
/*   CHOURS=CUM FLIGHT HOURS (X10000);*/
/*   AINC = CUM CLASS A INCIDENTS;     */
/*   BINC = CUM CLASS B INCIDENTS      <-
CARDS;
1977 1.28 1.28 1 0
1978 2.00 .72 1 0
1979 2.45 .45 1 0
1980 2.83 .38 2 0
1981 3.15 .32 3 2
1982 3.51 .36 3 2
1983 3.86 .35 4 2
1984 4.48 .62 8 2
1985 5.13 .65 11 3
1986 5.82 .69 14 3
1987 6.42 .60 20 3
1988 7.03 .61 23 3
1989 7.69 .66 24 3
```

                                                        MORE...

```
;
PROC NLIN;
    PARMS B0=0 B1=0 B2=0 B3=0;
        MODEL BINC=B0*CHOURS**3-B1*CHOURS**2+B2*CHOURS-B3;
            DER.B0=CHOURS**3;
            DER.B1=-CHOURS**2;
            DER.B2=CHOURS;
            DER.B3=-1;
    OUTPUT OUT = B P = PREDB R=YRESID ;
GOPTIONS DEVICE=TEK4014 VPOS 120;
    TITLE1 'UH-1 CLASS B (1977-1989) CUBIC EQUATION FIT';
    SYMBOL1 V=B ;
     SYMBOL2 V=DIAMOND .25 CM I=SPLINE;
PROC GPLOT;
    TITLE CUBIC FIT UH-1 PRED. CLASS B INCIDENTS;
   PLOT PREDB * CHOURS = 2
        BINC *  CHOURS = 1/OVERLAY;
   LABEL PREDB = 'CUM. CLASS B MISHAPS';
   LABEL HOURS = 'CUM. FLYING HOURS';
LEGEND;
PROC PRINT UNIFORM;
    VAR HOURS CHOURS BINC PREDB ;
```

                                                        MORE...

```
TOF:
 *    CHOURS=CUM FLIGHT HOURS (X10000);*/
/*    AINC = CUM CLASS A INCIDENTS;*/
/*    BINC = CUM CLASS B INCIDENTS;*/
DATA UH1H;
    INPUT YEAR CHOURS AINC BINC;
    CARDS;
1974 6.42 12 3
1975 13.0 38 8
1976 19.8 55 10
1977 27.0 66 13
1978 34.0 88 16
1979 41.0 98 19
1980 48.7 110 19
1981 56.1 124 23
1982 62.8 141 32
1983 69.7 148 37
1984 75.9 162 39
1985 82.1 172 41
1986 88.6 181 47
1987 95.0 188 49
1988   3 197 49
```

MORE...

```
;
   TITLE UH-1H CUM ACTUAL & PREDICTED CLASS B INCIDENTS 1974-1987;
/*      SAS PROGRAM TO FIT A CUBIC EQUATION TO CLASS B INCIDENTS     */
/*      FOR THE UH-1H AIRCRAFT.  1989 LINEAR FIT WAS POOR.           */
PROC NLIN;
    PARMS B0=0 B1=0 B2=0 B3=0;
        MODEL BINC=B0*CHOURS**3-B1*CHOURS**2+B2*CHOURS-B3;
            DER.B0=CHOURS**3;
            DER.B1=-CHOURS**2;
            DER.B2=CHOURS;
            DER.B3=-1;
    OUTPUT OUT = B P = PREDB R=RESID ;
GOPTIONS DEVICE=TEK4014 VPOS 120;
    TITLE1 'UH-1H CLASS B (1977-1989) CUBIC EQUATION FIT';
    SYMBOL1 V=B ;
     SYMBOL2 V=DIAMOND .25 CM I=SPLINE;
PROC GPLOT;
    TITLE CUBIC FIT UH-1H CUM. CLASS B INCIDENTS;
    PLOT PREDB * CHOURS = 2
         BINC *  CHOURS = 1/OVERLAY;
  LABEL PREDB = 'CUM. CLASS B MISHAPS';
        CHOURS = 'CUM. FLYING HOURS';
```

MORE...

```
LEGEND;
PROC PRINT UNIFORM;
    VAR CHOURS BINC PREDB ;
EOF:
```

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```
TOF:
/*    CHOURS=CUM FLIGHT HOURS (X10000);*/
/*    AINC = CUM CLASS A INCIDENTS;*/
/*    BINC = CUM CLASS B INCIDENTS;*/
DATA OH58;
     INPUT CHOURS AINC BINC;
     CARDS;
3.13 9 0
6.34 15 0
7.27 27 0
12.3 33 0
15.3 40 0
18.1 50 1
20.9 61 1
24.0 74 1
26.8 82 1
29.6 98 2
32.3 105 2
35.0 117 2
.
, TITLE OH-58 CUM ACTUAL & PREDICTED CLASS B INCIDENTS 1974-1987;
/*    SAS PROGRAM TO FIT A CUBIC EQUATION TO CLASS B INCIDENTS      */
```

```
/*      FOR THE OH-58 AIRCRAFT.  1989 LINEAR FIT WAS POOR.      */
PROC NLIN;
     PARMS B0=0 B1=0 B2=0 B3=0;
          MODEL BINC=B0*CHOURS**3-B1*CHOURS**2+B2*CHOURS-B3;
               DER.B0=CHOURS**3;
               DER.B1=-CHOURS**2;
               DER.B2=CHOURS;
               DER.B3=-1;
     OUTPUT OUT = B P = PREDB R=YRESID ;
GOPTIONS DEVICE=TEK4014 VPOS 120;
     TITLE1 'OH-58 CLASS B CUBIC EQUATION FIT';
     SYMBOL1 V=B ;
      SYMBOL2 V=DIAMOND .25 CM I=SPLINE;
PROC GPLOT;
     TITLE CUBIC FIT OH-58 CUM. CLASS B INCIDENTS;
     PLOT PREDB * CHOURS = 2
          BINC *  CHOURS = 1/OVERLAY;
   LABEL PREDB = 'CUM. CLASS B MISHAPS';
   LABEL CHOURS = 'CUM. FLYING HOURS';
LEGEND;
PROC PRINT UNIFORM;
     VAR CHOURS BINC PREDB ;
```

```
TOF:
/*    CHOURS=CUM FLIGHT HOURS (X10000);*/
/*    AINC = CUM CLASS A INCIDENTS;*/
/*    BINC = CUM CLASS B INCIDENTS;*/
DATA OH6;
     INPUT CHOURS AINC BINC;
     CARDS;
.302 4 0
.636 5 0
.992 5 0
1.32 8 0
1.61 8 0
1.94 8 0
2.27 9 0
2.63 10 1
2.98 11 1
3.25 11 1
3.50 12 1
3.75 12 1
4.06 13 1
.
   TITLE OH-6 CUM ACTUAL & PREDICTED CLASS B INCIDENTS 1974-1987;

                                                      MORE...
/*     SAS PROGRAM TO FI  - :    : IIUATION TC CLASS B INCIDENTS       */
 *       FJF THE OH-6 AIRCRAFT.  1989 LINEAR FIT WAS POOR.        */
PROC NLIN;
     PARMS B0=0 B1=0 B2=0 B3=0;
          MODEL BINC=B0*CHOURS**3-B1*CHOURS**2+B2*CHOURS-B3;
               DER.B0=CHOURS**3;
               DER.B1=-CHOURS**2;
               DER.B2=CHOURS;
               DER.B3=-1;
    OUTPUT OUT = B P = PREDB R=YRESID ;
GOPTIONS DEVICE=TEK4014 VPOS 120;
    TITLE1 'OH-6 CLASS B CUBIC EQUATION FIT';
      SYMBOL1 V=B ;
       SYMBOL2 V=DIAMOND .25 CM I=SPLINE;
PROC GPLOT;
    TITLE CUBIC FIT OH-6 CUM. CLASS B INCIDENTS;
    PLOT PREDB * CHOURS = 2
         BINC *  CHOURS = 1/OVERLAY;
   LABEL PREDB = 'CUM. CLASS B MISHAPS';
   LABEL CHOURS = 'CUM. FLYING HOURS';
LEGEND;
PROC PRINT UNIFORM;

                                                      MORE...

    VAR CHOURS BINC PREDB ;
EOF:
```

```
TOF:
/*    CHOURS=CUM FLIGHT HOURS (X 100,000);*/
/*    AINC = CUM CLASS A INCIDENTS;*/
/*    BINC = CUM CLASS B INCIDENTS;*/
DATA TH55A;
      INPUT CHOURS AINC BINC;
      CARDS;
1.19 17 0
1.94 23 0
2.77 26 0
3.42 30 0
3.96 31 0
4.64 31 0
5.65 31 0
6.64 31 0
7.67 31 0
8.65 31 0
9.57 32 0
10.6 32 0
;
    TITLE TH-55 CUM ACTUAL & PREDICTED CLASS B INCIDENTS 1974-1987;
/*      SAS PROGRAM TO FIT A CUBIC EQUATION TO CLASS A INCIDENTS      */

                                                        MORE...
/*      FOR THE TH-55 AIRCRAFT.   1989 LINEAR FIT WAS POOR.      */
PROC NLIN;
   )  PARMS B0=0 B1=0 B2=0 B3=0;
          MODEL AINC=B0*CHOURS**3-B1*CHOURS**2+B2*CHOURS-B3;
            DER.B0=CHOURS**3;.
            DER.B1=-CHOURS**2;
   )        DER.B2=CHOURS;
            DER.B3=-1;
    OUTPUT OUT = B P = PREDA R=YRESID ;
GOPTIONS DEVICE=TEK4014 VPOS 120;
    TITLE1 'TH-55 CLASS A CUBIC EQUATION FIT';
    SYMBOL1 V=B ;
     SYMBOL2 V=DIAMOND .25 CM I=SPLINE;
PROC GPLOT;                .
    TITLE CUBIC FIT TH-55 CUM. CLASS A INCIDENTS;
   PLOT PREDA * CHOURS = 2
        AINC *   CHOURS = 1/OVERLAY;
  LABEL PREDA = 'CUM. CLASS A MISHAPS';
  LABEL CHOURS = 'CUM. FLYING HOURS';
LEGEND;
PROC PRINT UNIFORM;
    VAR CHOURS AINC PREDA ;

                                                        MORE...
```