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# Statistics on Aircraft Gas Turbine Engine Rotor Failures that Occurred in U.S. Commercial Aviation During 1987

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Final Report

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## EXECUTIVE SUMMARY

This service data analysis is prepared on a calendar-year basis and published annually. The data support flight safety analyses, proposed regulatory actions, certification standards, and cost benefit analyses. The following statistics are based on gas turbine engine rotor failures that have occurred in United States commercial aviation during 1987.

Three hundred and thirty-two rotor failures occurred in 1987. These failures accounted for approximately 17.7 percent of the 1872 shutdowns experienced by the United States commercial fleet. Rotor fragments were generated in 170 of the failures and, of these, 12 were uncontained. This represents an uncontained failure rate of 1.0 per million gas turbine engine powered aircraft flight hours, or 0.3 per million engine operating hours. Approximately 12.5 million and 39.5 million aircraft flight and engine operating hours, respectively, were logged in 1987.

Turbine rotor fragment-producing failures were approximately 1.8 times greater than that of the compressor rotor fragment-producing failures; 104 and 57 respectively, of the total. Fan rotor failures accounted for 9 of the fragment-producing failures experienced.

Blade fragments were generated in 164 of the rotor failures; 8 of these were uncontained. The remaining 4 uncontained failures were produced by disk fragments.

Of the 223 known causes of failures (because of the high percentage of unknown causes of rotor failures, the percentages were based on the total number of known causes), the causal factors were (1) foreign object damage -- 92 (41.3 percent); (2) secondary causes -- 72 (32.3 percent); and (3) design and life prediction problems -- 50 (22.4 percent). One hundred and sixty-four (49.4 percent) of the 332 rotor failures occurred during the takeoff and climb stages of flight. Ninety-four (55.3 percent) of the 170 rotor fragment-producing failures and 7 (58.3 percent) of the 12 uncontained rotor failures occurred during these same stages of flight.

The incidence of engine rotor failures producing fragments has increased when compared to 1986 (140 in 1986 and 170 in 1987). The number of uncontained engine rotor failures reported has decreased 25 percent in 1987 (16 in 1986 and 12 in 1987). The 12-year (1976 through 1987) average of uncontained engine rotor failures is 15.0.

## INTRODUCTION

This report is sponsored and co-authored by the Federal Aviation Administration (FAA) Technical Center, located at the Atlantic City International Airport, New Jersey.

This service data analysis is published yearly. The data support flight safety analyses, proposed regulatory actions, certification standards, and cost benefit analyses.

The intent and purpose of this report is to present data as objectively as possible on gas turbine rotor failure occurrences in U.S. commercial aviation. Presented in this report are statistics on gas turbine engine utilization and failures that have occurred in U.S. commercial aviation during 1987. These statistics are based on service data compiled by the FAA Flight Standards District Office. The National Safety Data Branch of the FAA Aviation Standards National Field Office disseminated this information in a service difficulty data base and the Air Carrier Aircraft Utilization and Propulsion Reliability Reports. The FAA service data base contains only a fraction of the actual commercial helicopter fleet operating statistics. The number of turboshaft engines in use with the corresponding engine flight hours given herein are estimates derived primarily from statistics published by the Helicopter Association International in their helicopter annuals. The compiled data were analyzed to establish:

1. The incidence of rotor failures and the incidence of contained and uncontained rotor fragments (an uncontained rotor failure is defined as a rotor failure that produces fragments which penetrate and escape the confines of the engine casing).
2. The distribution of rotor failures with respect to engine rotor components, i.e., fan, compressor or turbine rotors and their rotating attachments or appendages such as spacers and seals.
3. The number of rotor failures according to engine model and engine fleet hours.
4. The type of rotor fragment (disk, rim, or blade) typically generated at failure.
5. The cause of failure.
6. The flight conditions at the time of failure.
7. Engine failure rate according to engine fleet hours.

## RESULTS

The data used for analysis are contained in appendix A. The results of these analyses are shown in figures 1 through 7 and tables 1 and 2.

Figure 1 shows that 332 rotor failures occurred in 1987. These rotor failures accounted for approximately 17.7 percent of the 1872 shutdowns experienced by the gas turbine powered U.S. commercial aircraft fleet during 1987. Rotor fragments were generated in 170 of the failures experienced and, of these, 12 (7.1 percent of the fragment-producing failures) were uncontained. This represents an uncontained failure rate of 1.0 per million gas turbine engine powered aircraft flight hours, or 0.3 per million engine operating hours.

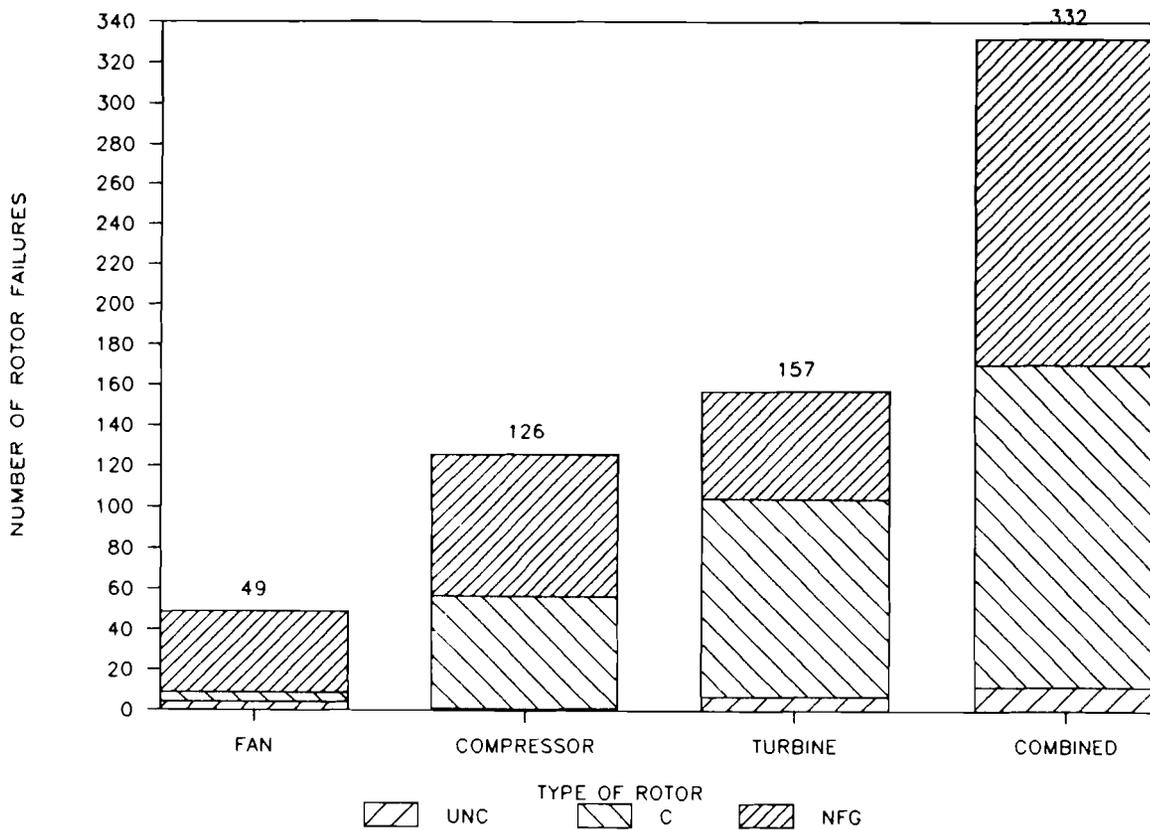


FIGURE 1. INCIDENCE OF ENGINE ROTOR FAILURES IN U.S. COMMERCIAL AVIATION - 1987

Approximately 12.5 million and 39.5 million aircraft flight and engine operating hours, respectively, were logged by the U.S. commercial aviation fleet in 1987. Gas turbine engine fleet operating hours relative to the number of rotor failures and type of engines in use are shown in figure 2.

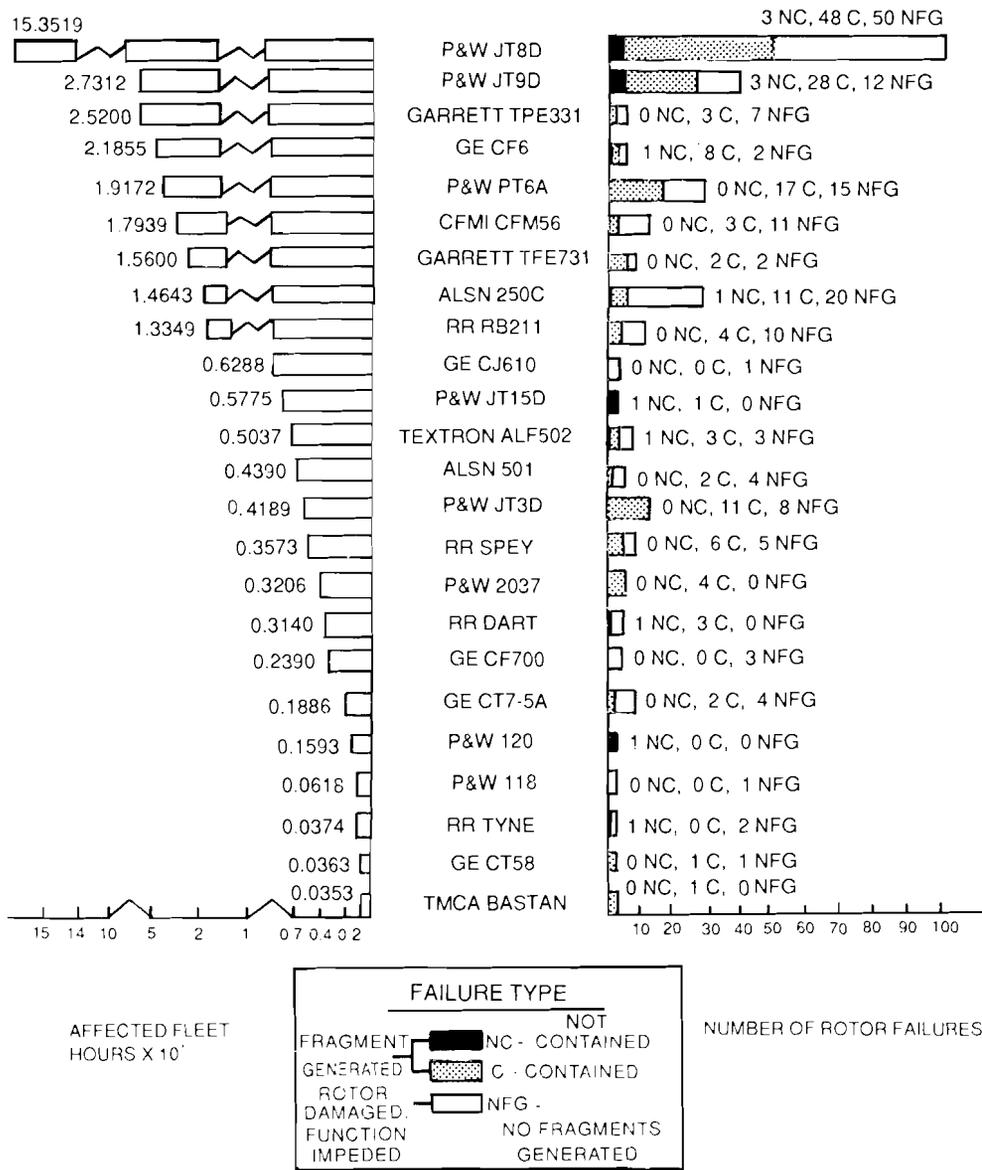


FIGURE 2. TYPE OF ENGINE ROTOR FAILURES IN U.S. COMMERCIAL AVIATION ACCORDING TO AFFECTED ENGINE MODEL AND ENGINE FLEET HOURS 1987

Figure 3 shows the distribution of rotor failures that produced fragments according to the engine component involved (fan, compressor, turbine), the type of fragments that were generated, and the percentage of uncontained failures according to the type of fragment generated. These data indicate that:

1. The incidence of turbine rotor failures was approximately 1.8 times greater than that of the compressor rotor failures; these corresponded to 104 (61.2 percent) and 57 (33.5 percent), respectively, of the total number of failures. Fan rotor failures accounted for 9 (5.3 percent) of the failures experienced.
2. Blade fragments were generated in 164 (96.5 percent) of the failures; eight (5.0 percent) of these were uncontained. The remaining six (3.5 percent) failures were produced by disk, rim, and seal. All four of the disk failures were uncontained. There were no uncontained rim or seal failures.

| ENGINE ROTOR COMPONENTS | TYPE OF FRAGMENT GENERATED |     |     |     |       |     |      |     |       |     |
|-------------------------|----------------------------|-----|-----|-----|-------|-----|------|-----|-------|-----|
|                         | DISK                       |     | RIM |     | BLADE |     | SEAL |     | TOTAL |     |
|                         | TF                         | UCF | TF  | UCF | TF    | UCF | TF   | UCF | TF    | UCF |
| FAN                     | 2                          | 2   | 0   | 0   | 7     | 2   | 0    | 0   | 9     | 4   |
| COMPRESSOR              | 0                          | 0   | 1   | 0   | 55    | 1   | 1    | 0   | 57    | 1   |
| TURBINE                 | 2                          | 2   | 0   | 0   | 102   | 5   | 0    | 0   | 104   | 7   |
| TOTAL                   | 4                          | 4   | 1   | 0   | 164   | 8   | 1    | 0   | 170   | 12  |

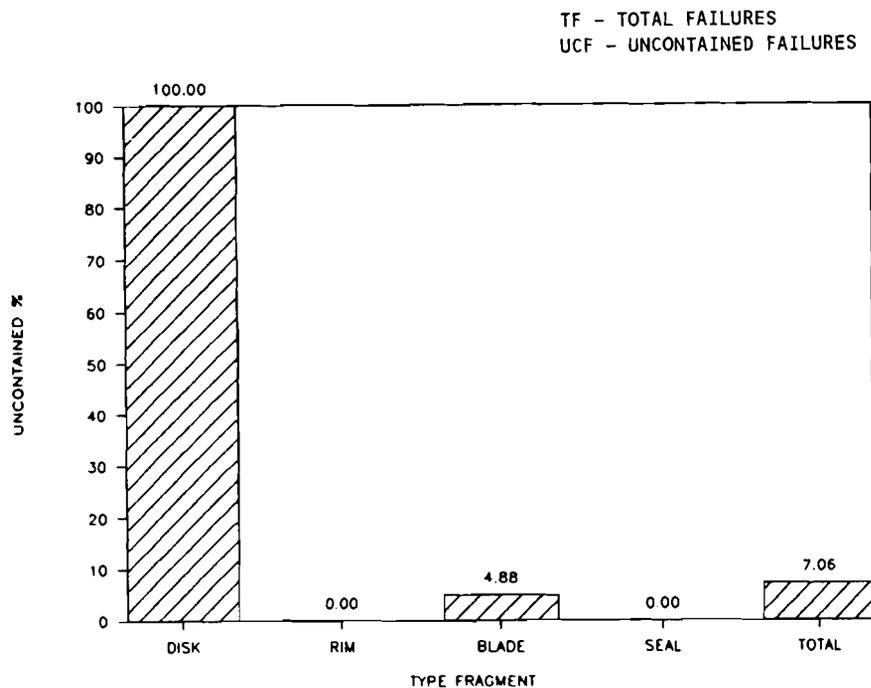
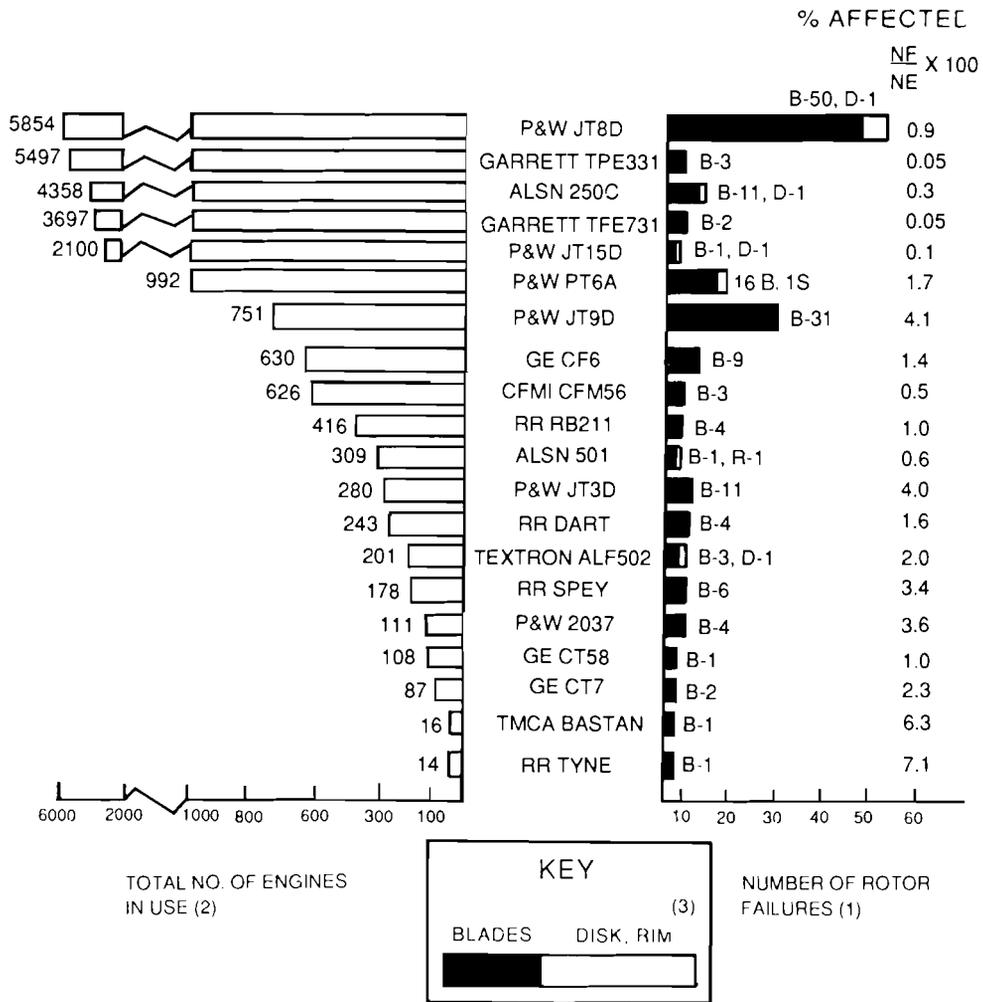


FIGURE 3. COMPONENT AND FRAGMENT TYPE DISTRIBUTIONS FOR CONTAINED AND UNCONTAINED ENGINE ROTOR FAILURES (FAILURES THAT PRODUCED FRAGMENTS) - 1987

Figure 4 shows the rotor failure distribution among the engine models that were affected and the total number of models in use.



NOTES (1) FAILURES THAT PRODUCED FRAGMENTS  
 (2) YEARLY AVERAGE OF AIRCRAFT IN USE AT END OF EACH MONTH  
 (3) SEAL/SPACER FAILURES INCLUDED IN DISK/RIM COMPILATION

FIGURE 4. THE INCIDENCE OF ENGINE ROTOR FAILURES IN U.S. COMMERCIAL AVIATION ACCORDING TO ENGINE MODEL AND COMPONENT AFFECTED - 1987

Figure 5 shows what caused the rotor failures to occur. Of the 223 known causes of failure (because of the high percentage of unknown causes of rotor failure, the percentages were based on the total number of known causes), the causal factors were (1) foreign object damage -- 92 (41.39 percent); (2) secondary causes -- 72 (32.3 percent); and (3) design and life prediction problems -- 50 (22.4 percent).

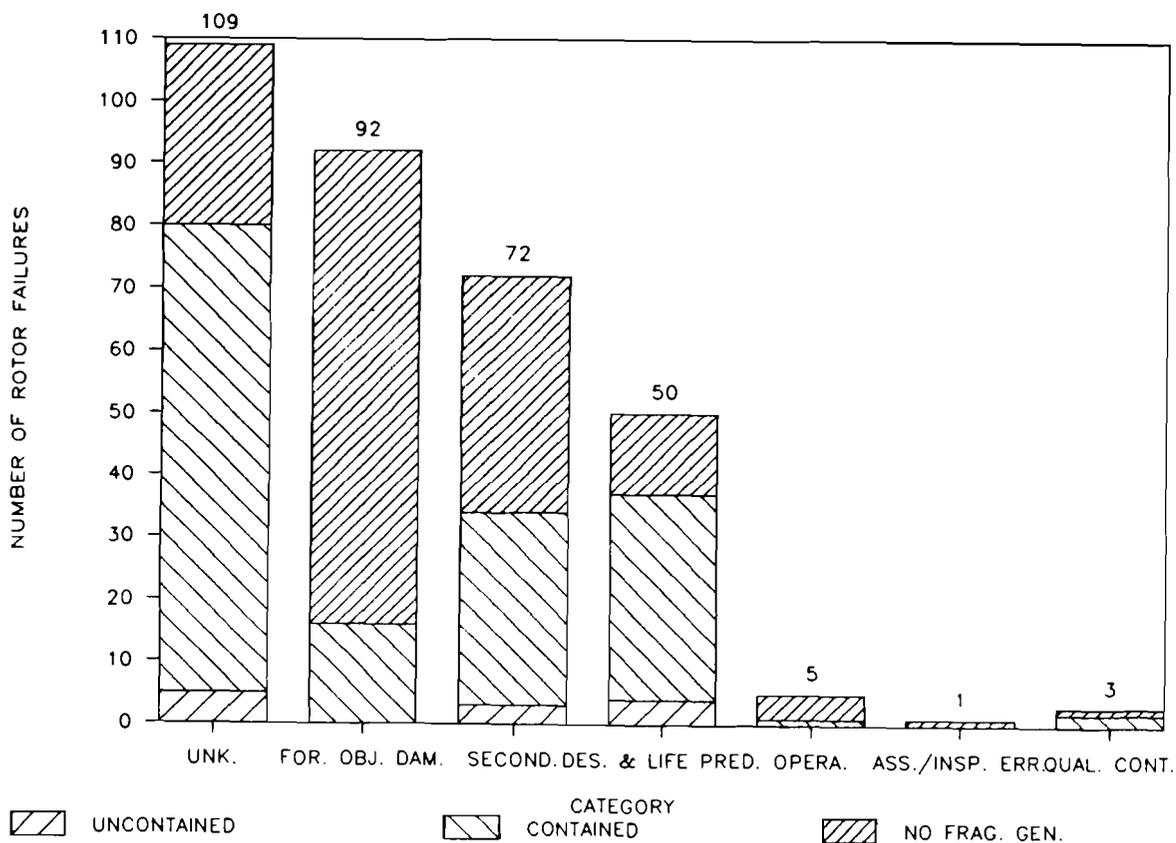


FIGURE 5. ENGINE ROTOR FAILURE CAUSE CATEGORIES - 1987

Figure 6 indicates the flight conditions that existed when the various rotor failures occurred. One hundred and sixty-four (49.4 percent) of the 332 rotor failures occurred during the takeoff and climb stages of flight. Ninety-four (55.3 percent) of the rotor fragment-producing failures and 7 (58.3 percent) of the uncontained rotor failures occurred during these same stages of flight. The highest number of uncontained rotor failures, 5 (42.0 percent), happened during takeoff.

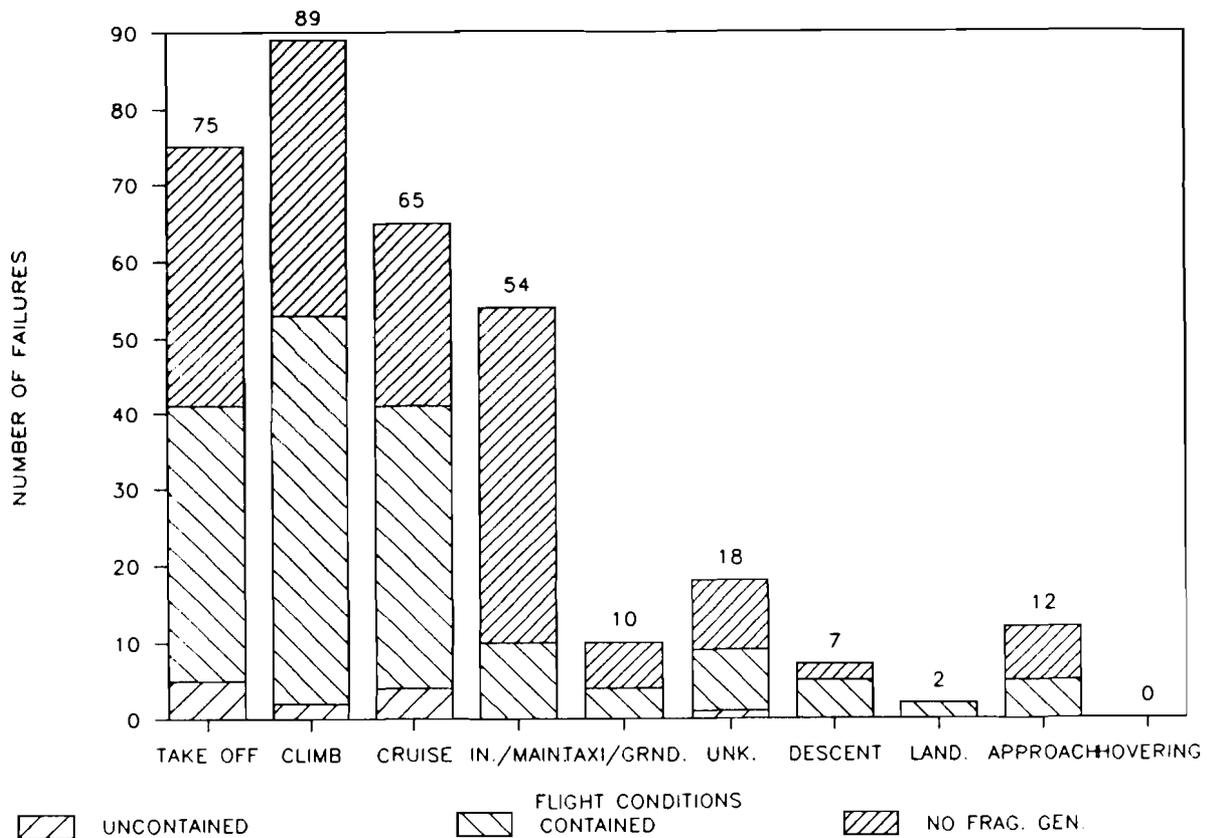


FIGURE 6. FLIGHT CONDITION AT ENGINE ROTOR FAILURE - 1987

Table 1 contains a compilation of engine failure rates per million engine flight hours according to engine model, engine type, and containment conditions. The engine failure rates per million flight hours by engine type are turbofan -- 8.4, turboprop -- 11.3, and turboshaft -- 16.9. Uncontained engine failure rates per million flight hours by engine type were turbofan -- 0.3, turboprop -- 0.5, and turboshaft -- 0.5.

Table 2 is a cumulative tabulation that describes the distribution of uncontained rotor failures according to fragment type, engine component involved, cause category, and flight condition (takeoff and climb are defined as "high power," all other conditions are defined as "low power") for the years 1976 through 1987. This figure is expanded yearly to include all subsequent uncontained rotor failures. These data indicate that for "secondary causes" the number of uncontained failures was approximately five times greater at high power than low power (namely 34 and 7). For "design and life prediction problems" the number of high power uncontained failures was approximately three times greater than low power (namely 30 and 9); and for "foreign object damage" the number of uncontained failures was four times greater at high power than low power (namely 8 and 2). This tabulation also indicates that of the 181 total uncontained incidences, blade failures accounted for 66.3 percent; disk failures 22.6 percent; rim failures 4.4 percent; and seal/spacer failures 6.6 percent.

TABLE 1. GAS TURBINE ENGINE FAILURE RATES ACCORDING TO ENGINE MODEL AND TYPE - 1987

| TYPE/<br>MODEL        | AVERAGE<br>NUMBER<br>IN USE | ENGINE<br>FLIGHT<br>HRS. x10 | NO. OF FAILURES* |    |     |       | FAIL. RATES/10<br>ENGINE FLIGHT HRS. |      |      |       |
|-----------------------|-----------------------------|------------------------------|------------------|----|-----|-------|--------------------------------------|------|------|-------|
|                       |                             |                              | C                | NC | N   | TOTAL | C                                    | NC   | N    | TOTAL |
| TURBOFAN/<br>TURBOJET |                             |                              |                  |    |     |       |                                      |      |      |       |
| JT8D                  | 5854                        | 15.3519                      | 48               | 3  | 50  | 101   | 3.1                                  | 0.2  | 3.3  | 6.6   |
| JT3D                  | 280                         | 0.4189                       | 11               | 0  | 8   | 19    | 26.3                                 | 0.0  | 19.1 | 45.4  |
| JT9D                  | 751                         | 2.7312                       | 28               | 3  | 12  | 43    | 10.3                                 | 1.1  | 4.4  | 15.7  |
| CF6                   | 630                         | 2.1855                       | 8                | 1  | 2   | 11    | 3.7                                  | 0.5  | 0.9  | 5.0   |
| RB211                 | 416                         | 1.3349                       | 4                | 0  | 10  | 14    | 3.0                                  | 0.0  | 7.5  | 10.5  |
| PW2037/2040           | 111                         | 0.3206                       | 4                | 0  | 0   | 4     | 12.5                                 | 0.0  | 0.0  | 12.5  |
| SPEY                  | 178                         | 0.3573                       | 6                | 0  | 5   | 11    | 16.8                                 | 0.0  | 14.0 | 30.8  |
| TFE731                | 3697                        | 1.5600                       | 2                | 0  | 2   | 4     | 1.3                                  | 0.0  | 1.3  | 2.6   |
| CFM56                 | 626                         | 1.7939                       | 3                | 0  | 11  | 14    | 1.7                                  | 0.0  | 6.1  | 7.8   |
| ALF502                | 201                         | 0.5037                       | 3                | 1  | 3   | 7     | 5.9                                  | 2.0  | 5.9  | 13.9  |
| JT15D                 | 2100                        | 0.5775                       | 1                | 1  | 0   | 2     | 1.7                                  | 1.7  | 0.0  | 3.5   |
| CF700                 | 498                         | 0.2390                       | 0                | 0  | 3   | 3     | 0.0                                  | 0.0  | 12.6 | 12.6  |
| CJ610                 | 1310                        | 0.6288                       | 0                | 0  | 1   | 1     | 0.0                                  | 0.0  | 1.6  | 1.6   |
| TOTAL                 | 16,652                      | 28.0032                      | 118              | 9  | 107 | 234   | 4.2                                  | 0.3  | 3.8  | 8.4   |
| TURBOPROP             |                             |                              |                  |    |     |       |                                      |      |      |       |
| PT6A                  | 992                         | 1.9172                       | 17               | 0  | 15  | 32    | 8.9                                  | 0.0  | 7.8  | 16.7  |
| A501                  | 309                         | 0.4390                       | 2                | 0  | 4   | 6     | 4.6                                  | 0.0  | 9.1  | 13.7  |
| TPE331                | 5497                        | 2.5200                       | 3                | 0  | 7   | 10    | 1.2                                  | 0.0  | 2.8  | 4.0   |
| DART                  | 243                         | 0.3140                       | 3                | 1  | 0   | 4     | 9.6                                  | 3.2  | 0.0  | 12.7  |
| PW120                 | 73                          | 0.1593                       | 0                | 1  | 0   | 1     | 0.0                                  | 6.3  | 0.0  | 6.3   |
| BASTAN                | 16                          | 0.0353                       | 1                | 0  | 0   | 1     | 28.3                                 | 0.0  | 0.0  | 28.3  |
| TYNE                  | 14                          | 0.0374                       | 0                | 1  | 2   | 3     | 0.0                                  | 26.7 | 53.5 | 80.2  |
| CT7-5A                | 87                          | 0.1886                       | 2                | 0  | 4   | 6     | 10.6                                 | 0.0  | 21.2 | 31.8  |
| PW118                 | 26                          | 0.0618                       | 0                | 0  | 1   | 1     | 0.0                                  | 0.0  | 16.2 | 16.2  |
| TOTAL                 | 7,257                       | 5.6726                       | 28               | 3  | 33  | 64    | 4.9                                  | 0.5  | 5.8  | 11.3  |
| TURBOSHAFT            |                             |                              |                  |    |     |       |                                      |      |      |       |
| A250C                 | 4358                        | 1.4643                       | 11               | 1  | 20  | 32    | 7.5                                  | 0.7  | 13.7 | 21.9  |
| CT58                  | 108                         | 0.0363                       | 1                | 0  | 1   | 2     | 27.5                                 | 0.0  | 27.5 | 55.0  |
| ALL OTHERS            | 1534                        | 0.5154                       | 0                | 0  | 0   | 0     | 0.0                                  | 0.0  | 0.0  | 0.0   |
| TOTAL                 | 6,000**                     | 2.0163**                     | 12               | 1  | 22  | 34    | 5.9                                  | 0.5  | 10.9 | 16.9  |

C = CONTAINED      NC = NOT CONTAINED  
N = FUNCTION IMPEDED, NO FRAGMENTS GENERATED

\*As reported by service difficulty reports only.

\*\*Estimated total number in use and engine flight hours for entire U.S. commercial fleet.

TABLE 2. UNCONTINUED ENGINE ROTOR FAILURE DISTRIBUTIONS ACCORDING TO CAUSE AND FLIGHT CONDITIONS - 1976 THROUGH 1987

| TYPE OF FRAGMENT GENERATED      |              | DISK |      |      | RIM |      |      | BLADE |      |      | SEAL |      |      | SUB TOT | TOTAL |
|---------------------------------|--------------|------|------|------|-----|------|------|-------|------|------|------|------|------|---------|-------|
| ENGINE ROTOR COMPONENT          |              | FAN  | COMP | TURB | FAN | COMP | TURB | FAN   | COMP | TURB | FAN  | COMP | TURB |         |       |
| CAUSE                           | FLIGHT COND. |      |      |      |     |      |      |       |      |      |      |      |      |         |       |
| DESIGN/LIFE PREDICTION PROBLEMS | HI           | 1    | 5    | 0    | 0   | 3    | 0    | 9     | 9    | 2    | 0    | 1    | 0    | 30      | 39    |
|                                 | LOW          | 0    | 1    | 3    | 0   | 0    | 0    | 1     | 0    | 4    | 0    | 0    | 0    | 9       |       |
|                                 | UNK          | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       |       |
| SECONDARY CAUSES                | HI           | 0    | 1    | 0    | 0   | 0    | 0    | 5     | 4    | 21   | 0    | 0    | 3    | 34      | 43    |
|                                 | LOW          | 0    | 0    | 1    | 0   | 0    | 0    | 0     | 2    | 4    | 0    | 0    | 0    | 7       |       |
|                                 | UNK          | 0    | 0    | 0    | 0   | 0    | 0    | 1     | 0    | 1    | 0    | 0    | 0    | 2       |       |
| FOREIGN OBJECT DAMAGE           | HI           | 1    | 0    | 1    | 0   | 0    | 0    | 6     | 0    | 0    | 0    | 0    | 0    | 8       | 12    |
|                                 | LOW          | 0    | 0    | 0    | 0   | 0    | 0    | 2     | 0    | 0    | 0    | 0    | 0    | 2       |       |
|                                 | UNK          | 0    | 0    | 0    | 0   | 0    | 0    | 2     | 0    | 0    | 0    | 0    | 0    | 2       |       |
| QUALITY CONTROL                 | HI           | 0    | 1    | 0    | 0   | 0    | 1    | 2     | 0    | 0    | 0    | 0    | 0    | 4       | 4     |
|                                 | LOW          | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       |       |
|                                 | UNK          | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       |       |
| OPERATIONAL                     | HI           | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       | 0     |
|                                 | LOW          | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       |       |
|                                 | UNK          | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       |       |
| ASSEMBLY/ INSP. REPORTS         | HI           | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       | 1     |
|                                 | LOW          | 0    | 0    | 1    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 1       |       |
|                                 | UNK          | 0    | 0    | 0    | 0   | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0       |       |
| UNKNOWN                         | HI           | 1    | 2    | 12   | 0   | 3    | 0    | 6     | 10   | 14   | 1    | 2    | 3    | 54      | 82    |
|                                 | LOW          | 1    | 0    | 8    | 0   | 1    | 0    | 0     | 2    | 9    | 0    | 1    | 1    | 23      |       |
|                                 | UNK          | 0    | 0    | 1    | 0   | 0    | 0    | 1     | 0    | 3    | 0    | 0    | 0    | 5       |       |
| SUBTOTAL                        | HI           | 3    | 9    | 13   | 0   | 6    | 1    | 28    | 23   | 37   | 1    | 3    | 6    | 130     | 181   |
|                                 | LOW          | 1    | 1    | 13   | 0   | 1    | 0    | 3     | 4    | 17   | 0    | 1    | 1    | 42      |       |
|                                 | UNK          | 0    | 0    | 1    | 0   | 0    | 0    | 4     | 0    | 4    | 0    | 0    | 0    | 9       |       |
| TOTAL                           |              | 41   |      |      | 8   |      |      | 120   |      |      | 12   |      |      | 181     |       |

\* Takeoff and climb are defined as "High Power" and all other conditions are defined as "Low Power".

Figure 7 shows the annual incidence of uncontained rotor failures in commercial aviation for the years 1962 through 1987. During 1987, the incidence of uncontained rotor failures decreased by four over the previous year, 1986. Over the past 12 years, 1976 through 1987, an average of 15.0 uncontained rotor failures per year have occurred. During the same time period, the rate of uncontained rotor failures has remained relatively constant at an average of approximately one per million operating hours.

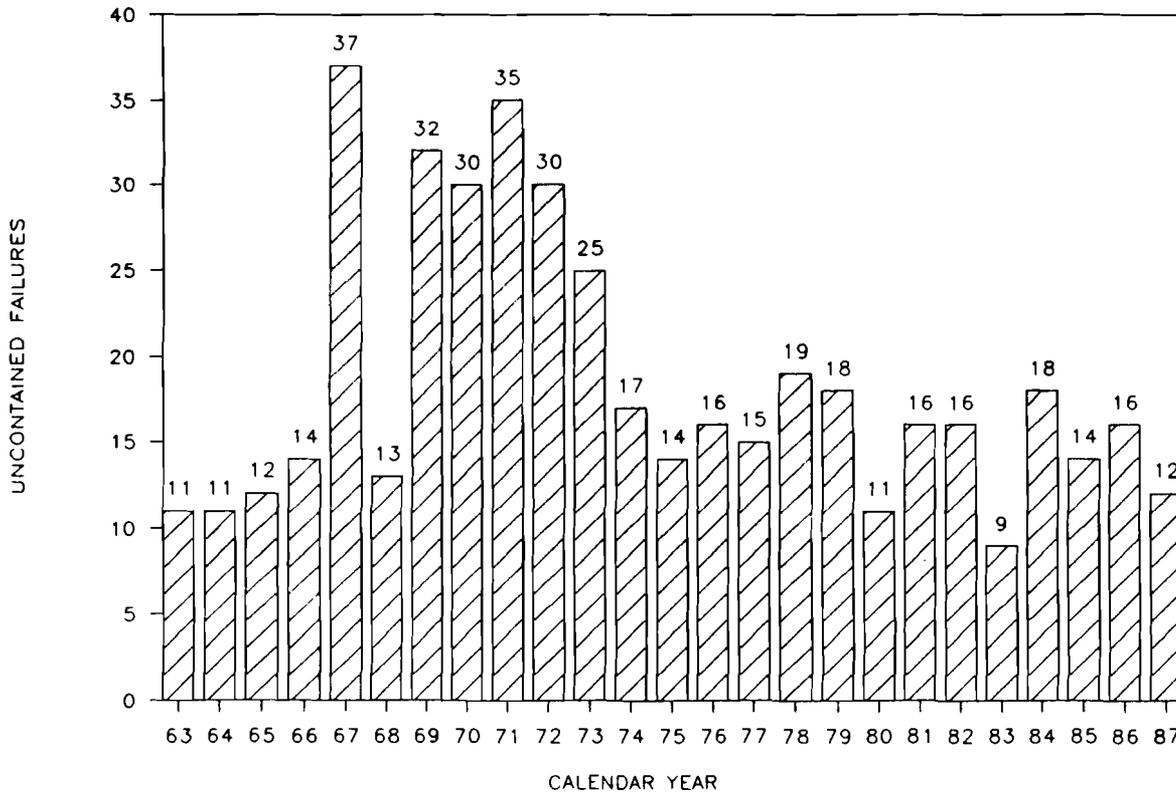


FIGURE 7. THE INCIDENCE OF UNCONTAINED ENGINE ROTOR FAILURES IN U.S. COMMERCIAL AVIATION, 1963 - 1987

## DISCUSSION AND CONCLUSIONS

The incidence of engine rotor fragment-producing failures has remained relatively constant when compared to 1986 (140 in 1986 and 170 in 1987). The uncontained engine rotor failures has decreased 25 percent (12 in 1987 and 16 in 1986). The 12-year (1976 through 1987) average of uncontained engine rotor failures is 15.0.

Of the 12 uncontained events that occurred during 1987, 7 (58.3 percent) involved turbine rotors, 1 (8.3 percent) involved compressor rotors, and 4 (33.3 percent) involved fan rotors.

The predominant cause of failure was attributed to foreign object damage (41.3 percent of the known failures). No uncontained failures occurred in this category. Secondary causes (32.3 percent of the known failures) had three uncontained failures and design and life prediction problems (22.4 percent of the known causes) had four uncontained failures. Assembly and inspection error had no uncontained failures. The causes of the remaining five uncontained failures (41.7 percent) are unknown.

Uncontained failures occurred in 4 of the 10 flight modes; i.e., 5 during takeoff (41.7 percent); 2 during climb (16.7 percent); 4 in cruise (33.3 percent), and 1 was unknown (8.3 percent).

The higher incidences of uncontained rotor failures in calendar years 1967 through 1973 (except for 1968) were probably due to the introduction of newly developed engines entering the commercial aviation fleet, such as the JT9D and CF6 engines.

Structural life predictions and verification are being improved by the increased use of spin chamber testing by government and industry as a means of obtaining failure data for statistically significant samples. In addition, increased development and application of high sensitivity, nondestructive inspection methods should increase the probability of cracks being detected prior to failure. The capability to reduce the causes of failures from secondary effects is also being addressed through technology development programs. However, causes due to foreign object damage still appear to be beyond the control or scope of present technology.

APPENDIX A

Data of Engine Rotor Failures in U.S. Commercial  
Aviation for 1987. Compiled from the  
Federal Aviation Administration  
Service Difficulty Reports.

Data Compilation Key

Component Code:

F - Fan  
C - Compressor  
T - Turbine

Fragment Type Code:

D - Disk  
R - Rim  
B - Blade  
S - Seal  
N - None

Cause Code:

1 - Design and Life Prediction Problems  
2 - Secondary Causes  
3 - Foreign Object Damage  
4 - Quality Control  
5 - Operational  
6 - Assembly and Inspection Error  
7 - Unknown

Containment Condition Code:

C - Contained  
NC - Not Contained  
N - No Fragments Generated

Flight Condition Code:

1 - Insp/Maint  
2 - Taxi/Grnd Hd1  
3 - Takeoff  
4 - Climb  
5 - Cruise  
6 - Descent  
7 - Approach  
8 - Landing  
9 - Hovering  
10 - Unknown

CHARACTERISTICS OF ROTOR FAILURES - 1987

| <u>SDR NO.</u> | <u>SUBMIT.</u> | <u>AIRCRAFT</u> | <u>ENG./LOC.</u> | <u>COMPNT</u> | <u>FRAG.</u><br><u>TYPE</u> | <u>CAUSE</u> | <u>CONTN. FLT.</u><br><u>COND. COND.</u> |    |
|----------------|----------------|-----------------|------------------|---------------|-----------------------------|--------------|--|----|
| 870213024      | UALA           | B727            | JT8D             | T             | B                           | 2            | C  | 4  |
| 870727028      | ATLA           | B727            | JT8D             | T             | B                           | 2            | C  | 4  |
| 870424019      | UALA           | B727            | JT8D/No.3        | C             | B                           | 1            | NC                                       | 3  |
| 870619016      | UALA           | B727            | JT8D             | T             | B                           | 7            | C  | 3  |
| 870403052      | EALA           | B727            | JT8D             | T             | B                           | 2            | C  | 5  |
| 870828045      | BNFA           | B727            | JT8D             | T             | B                           | 1            | C  | 4  |
| 870220009      | TWAA           | B727            | JT8D             | T             | B                           | 4            | C  | 4  |
| 870327002      | PEXA           | B727            | JT8D             | C             | B                           | 7            | C  | 5  |
| 871228041      | DALA           | B727            | JT8D/No.2        | F             | B                           | 1            | NC                                       | 3  |
| 870220008      | FDEA           | B727            | JT8D             | T             | B                           | 1            | C  | 4  |
| 870313022      | NWAA           | B727            | JT8D             | T             | B                           | 7            | C  | 4  |
| 870417020      | NWAA           | B727            | JT8D             | C             | B                           | 1            | C  | 3  |
| 871204042      | NWAA           | B727            | JT8D             | T             | B                           | 1            | C  | 4  |
| 870213009      | TWAA           | B727            | JT8D             | T             | B                           | 7            | C  | 5  |
| 870327005      | TWAA           | B727            | JT8D             | T             | B                           | 2            | C  | 4  |
| 870213060      | TAGA           | B727            | JT8D             | T             | B                           | 7            | C  | 5  |
| 870306018      | AWXA           | B737            | JT8D             | C             | B                           | 2            | C  | 4  |
| 870911011      | TSAA           | B737            | JT8D             | T             | B                           | 1            | C  | 3  |
| 870320016      | SWAA           | B737            | JT8D             | T             | B                           | 1            | C  | 4  |
| 870807016      | PAIA           | B737            | JT8D             | C             | B                           | 1            | C  | 6  |
| 870508013      | PAIA           | B737            | JT8D             | T             | B                           | 4            | C  | 3  |
| 870925033      | DALA           | B737            | JT8D             | C             | B                           | 1            | C  | 4  |
| 870213021      | RJEF           | B737            | JT8D             | T             | B                           | 2            | C  | 5  |
| 870410014      | PAIA           | B737            | JT8D             | T             | B                           | 2            | C  | 5  |
| 870828018      | UALA           | B737            | JT8D             | F             | B                           | 1            | C  | 2  |
| 870615020      | PAIA           | B737            | JT8D             | T             | B                           | 7            | C  | 5  |
| 871211063      | RJEF           | B737            | JT8D             | T             | B                           | 2            | C  | 5  |
| 880104009      | DALA           | B727            | JT8D             | C             | B                           | 3            | C  | 4  |
| 880104018      | UALA           | B727            | JT8D             | T             | B                           | 1            | C  | 10 |
| 880115022      | PAAA           | B727            | JT8D             | C             | B                           | 7            | C  | 3  |
| 880129010      | NWAA           | B727            | JT8D             | T             | B                           | 2            | C  | 4  |
| 880108002      | USAA           | B727            | JT8D/No.2        | F             | D                           | 1            | NC                                       | 3  |
| 870911007      | NWAA           | DC9             | JT8D             | T             | B                           | 2            | C  | 3  |
| 870918002      | TAGA           | DC9             | JT8D             | C             | B                           | 3            | C  | 3  |
| 870529015      | TWAA           | DC9             | JT8D             | T             | B                           | 2            | C  | 4  |
| 871106008      | HALA           | DC9             | JT8D             | T             | B                           | 7            | C  | 3  |
| 870417012      | REPA           | DC9             | JT8D             | C             | B                           | 3            | C  | 4  |
| 871016011      | REPA           | DC9             | JT8D             | T             | B                           | 1            | C  | 4  |
| 870911004      | NWAA           | DC9             | JT8D             | T             | B                           | 1            | C  | 4  |
| 870417018      | EALA           | DC9             | JT8D             | T             | B                           | 7            | C  | 3  |
| 870306023      | USAA           | DC9             | JT8D             | T             | B                           | 7            | C  | 3  |
| 870925035      | REPA           | DC9             | JT8D             | T             | B                           | 2            | C  | 5  |
| 870518085      | OZAA           | DC9             | JT8D             | F             | B                           | 3            | C  | 3  |
| 870824061      | REPA           | DC9             | JT8D             | T             | B                           | 7            | C  | 3  |
| 870515004      | NWAA           | DC9             | JT8D             | T             | B                           | 1            | C  | 3  |
| 870706011      | REPA           | DC9             | JT8D             | T             | B                           | 7            | C  | 3  |
| 870501008      | MACA           | DC9             | JT8D             | C             | B                           | 2            | C  | 4  |
| 870925193      | PSAA           | DC9             | JT8D             | C             | B                           | 3            | C  | 4  |
| 870417015      | USAA           | B727            | JT8D             | T             | B                           | 1            | C  | 4  |
| 870911008      | NWAA           | B727            | JT8D             | T             | B                           | 1            | C  | 4  |

| <u>SDR NO.</u> | <u>SUBMIT.</u> | <u>AIRCRAFT</u> | <u>ENG./LOC.</u> | <u>COMPNT</u> | <u>FRAG.</u><br><u>TYPE</u> | <u>CAUSE</u> | <u>CONTN.</u><br><u>COND.</u> | <u>FLT.</u><br><u>COND.</u> |
|----------------|----------------|-----------------|------------------|---------------|-----------------------------|--------------|-------------------------------|-----------------------------|
| 870410015      | PAIA           | B727            | JT8D             | C             | B                           | 3            | C                             | 4                           |
| 870403036      | MIDA           | DC9             | JT8D             | T             | N                           | 7            | N                             | 4                           |
| 870921100      | MIDA           | DC9             | JT8D             | T             | N                           | 7            | N                             | 3                           |
| 870130079      | MIDA           | DC9             | JT8D             | T             | N                           | 7            | N                             | 3                           |
| 871019050      | HALA           | DC9             | JT8D             | C             | N                           | 3            | N                             | 4                           |
| 871009133      | HALA           | DC9             | JT8D             | C             | N                           | 3            | N                             | 1                           |
| 870413044      | CALA           | DC9             | JT8D             | F             | N                           | 3            | N                             | 4                           |
| 871023015      | AALA           | DC9             | JT8D             | T             | N                           | 7            | N                             | 7                           |
| 870828031      | NWAA           | B727            | JT8D             | T             | N                           | 7            | N                             | 4                           |
| 870807040      | PCSA           | B727            | JT8D             | T             | N                           | 2            | N                             | 1                           |
| 870821020      | PAIA           | B727            | JT8D             | C             | N                           | 3            | N                             | 6                           |
| 870529048      | PAIA           | B727            | JT8D             | F             | N                           | 3            | N                             | 1                           |
| 870529101      | PAIA           | B727            | JT8D             | F             | N                           | 3            | N                             | 1                           |
| 870821112      | CLGA           | B727            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870529019      | CLGA           | B727            | JT8D             | F             | N                           | 3            | N                             | 1                           |
| 880111215      | TWAA           | DC9             | JT8D             | F             | N                           | 3            | N                             | 4                           |
| 880115111      | EALA           | B727            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 880115048      | AWXA           | B737            | JT8D             | C             | N                           | 2            | N                             | 6                           |
| 870220012      | ACLA           | B737            | JT8D             | F             | N                           | 3            | N                             | 1                           |
| 870619117      | AWXA           | B737            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 871204106      | AWXA           | B737            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870508003      | PAIA           | B737            | JT8D             | C             | N                           | 3            | N                             | 1                           |
| 871127001      | AFLA           | B737            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870508004      | PAIA           | B737            | JT8D             | C             | N                           | 2            | N                             | 1                           |
| 870817019      | PAIA           | B737            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 871204035      | DALA           | B737            | JT8D             | T             | N                           | 2            | N                             | 3                           |
| 870130063      | UALA           | B737            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870320030      | FDEA           | B727            | JT8D             | C             | N                           | 3            | N                             | 4                           |
| 871211017      | EALA           | DC9             | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870508028      | EALA           | DC9             | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870424084      | EALA           | DC9             | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870327014      | GATA           | B727            | JT8D             | C             | N                           | 3            | N                             | 4                           |
| 870330143      | ACLA           | B737            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870717086      | MIDA           | DC9             | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870731171      | RJGO           | B727            | JT8D             | T             | N                           | 2            | N                             | 1                           |
| 870213001      | UALA           | B727            | JT8D             | F             | N                           | 3            | N                             | 2                           |
| 870309024      | BNFA           | B727            | JT8D             | C             | N                           | 2            | N                             | 1                           |
| 871030004      | USAA           | B727            | JT8D             | C             | N                           | 3            | N                             | 4                           |
| 870619022      | DALA           | B727            | JT8D             | F             | N                           | 1            | N                             | 1                           |
| 870220023      | DALA           | B727            | JT8D             | F             | N                           | 1            | N                             | 1                           |
| 870608039      | DALA           | B727            | JT8D             | F             | N                           | 3            | N                             | 4                           |
| 870406047      | PAAA           | B727            | JT8D             | T             | N                           | 7            | N                             | 5                           |
| 871106022      | PEXA           | B727            | JT8D             | F             | N                           | 3            | N                             | 3                           |
| 870928094      | DALA           | B727            | JT8D             | F             | N                           | 3            | N                             | 4                           |
| 870911006      | NWAA           | B727            | JT8D             | F             | N                           | 3            | N                             | 4                           |
| 870626021      | NWAA           | B727            | JT8D             | C             | N                           | 3            | N                             | 5                           |
| 870710080      | PAIA           | B727            | JT8D             | F             | N                           | 3            | N                             | 1                           |
| 870526065      | PAIA           | B727            | JT8D             | F             | N                           | 3            | N                             | 1                           |
| 880115032      | PAAA           | B727            | JT8D             | T             | N                           | 7            | N                             | 4                           |
| 880122032      | KTIA           | B727            | JT8D             | C             | N                           | 3            | N                             | 4                           |
| 880129099      | DALA           | B727            | JT8D             | C             | N                           | 1            | N                             | 1                           |
| 870921099      | PLAA           | NORD 262A       | BASTAN           | C             | B                           | 7            | C                             | 5                           |

| <u>SDR NO.</u> | <u>SUBMIT.</u> | <u>AIRCRAFT</u> | <u>ENG./LOC.</u> | <u>COMPNT</u> | <u>FRAG.<br/>TYPE</u> | <u>CAUSE</u> | <u>CONTN.<br/>COND.</u> | <u>FLT.<br/>COND.</u> |
|----------------|----------------|-----------------|------------------|---------------|-----------------------|--------------|-------------------------|-----------------------|
| 870324015      | AMWA           | SF340A          | CT7-5A           | T             | B                     | 7            | C                       | 4                     |
| 880226007      | COMA           | SF340A          | CT7-5A           | T             | B                     | 7            | C                       | 5                     |
| 871120024      | PLGA           | SF340A          | CT7-5A           | C             | N                     | 3            | N                       | 3                     |
| 870724057      | AMWA           | SF340A          | CT7-5A           | C             | N                     | 7            | N                       | 5                     |
| 870925038      | PLGA           | SF340A          | CT7-5A           | T             | N                     | 2            | N                       | 4                     |
| 871231083      | REXA           | SF340A          | CT7-5A           | T             | N                     | 5            | N                       | 3                     |
| 870518122      | BHAA           | B99             | PT6A             | T             | B                     | 7            | C                       | 7                     |
| 870817052      | MAVA           | DHC6            | PT6A             | T             | B                     | 7            | C                       | 5                     |
| 870304014      | VISA           | STCG73          | PT6A             | T             | B                     | 7            | C                       | 7                     |
| 870424010      | CHQA           | SD330           | PT6A             | T             | B                     | 7            | C                       | 10                    |
| 870223164      | CHQA           | SD330           | PT6A             | T             | B                     | 7            | C                       | 1                     |
| 870116041      | SALA           | SD330           | PT6A             | C             | B                     | 7            | C                       | 5                     |
| 870904004      | SJSA           | DHC7            | PT6A             | C             | B                     | 2            | C                       | 5                     |
| 871023007      | AAGA           | 1400C           | PT6A             | T             | B                     | 1            | C                       | 4                     |
| 870925152      | PLGA           | SD360           | PT6A             | T             | B                     | 1            | C                       | 4                     |
| 871009184      | HNAA           | SD330           | PT6A             | T             | B                     | 2            | C                       | 3                     |
| 871120102      | CROA           | SD330           | PT6A             | T             | B                     | 2            | C                       | 2                     |
| 880111001      | SWJA           | SD360           | PT6A             | C             | S                     | 7            | C                       | 10                    |
| 880129036      | RANA           | DHC7            | PT6A             | T             | B                     | 5            | C                       | 10                    |
| 871210030      | SW62           | AT400           | PT6A             | C             | B                     | 7            | C                       | 10                    |
| 871210026      | SW62           | UNKNOWN         | PT6A             | C             | B                     | 7            | C                       | 1                     |
| 871210028      | SW62           | UNKNOWN         | PT6A             | C             | B                     | 7            | C                       | 1                     |
| 871210029      | SW62           | UNKNOWN         | PT6A             | C             | B                     | 7            | C                       | 1                     |
| 870611155      | GLO3           | 65A90           | PT6A             | C             | N                     | 3            | N                       | 5                     |
| 870304020      | CHQA           | B99             | PT6A             | T             | N                     | 2            | N                       | 1                     |
| 871030034      | CHQA           | SD330           | PT6A             | T             | N                     | 7            | N                       | 1                     |
| 871009214      | HALA           | DHC7            | PT6A             | T             | N                     | 3            | N                       | 5                     |
| 871211024      | ASOA           | DHC7            | PT6A             | T             | N                     | 7            | N                       | 7                     |
| 871022066      | PCAA           | 1900C           | PT6A             | C             | N                     | 2            | N                       | 5                     |
| 871207034      | CLTA           | 1900C           | PT6A             | C             | N                     | 2            | N                       | 4                     |
| 870116043      | SIMA           | SD360           | PT6A             | T             | N                     | 2            | N                       | 5                     |
| 870629027      | SABA           | SD360           | PT6A             | C             | N                     | 3            | N                       | 5                     |
| 870724106      | SALA           | SD360           | PT6A             | C             | N                     | 2            | N                       | 10                    |
| 870803060      | SALA           | SD330           | PT6A             | C             | N                     | 3            | N                       | 2                     |
| 880115009      | CHQA           | SD330           | PT6A             | T             | N                     | 6            | N                       | 10                    |
| 880125011      | SWJA           | SD360           | PT6A             | T             | N                     | 2            | N                       | 1                     |
| 880122024      | SIMA           | SD360           | PT6A             | C             | N                     | 2            | N                       | 5                     |
| 871216058      | WTAA           | EMB110          | PT6A             | C             | N                     | 3            | N                       | 7                     |
| 870403064      | PAAA           | A310            | JT9D             | C             | B                     | 3            | C                       | 5                     |
| 870713192      | FTLA           | B747            | JT9D             | T             | B                     | 7            | C                       | 4                     |
| 870612069      | FTLA           | B747            | JT9D             | T             | B                     | 7            | C                       | 3                     |
| 870918077      | PAAA           | B747            | JT9D             | T             | B                     | 7            | C                       | 3                     |
| 870612034      | PAAA           | B747            | JT9D             | C             | B                     | 7            | C                       | 3                     |
| 871211015      | PAAA           | B747            | JT9D             | T             | B                     | 7            | C                       | 3                     |
| 871204006      | TAGA           | B747            | JT9D/No. 4       | T             | B                     | 7            | NC                      | 4                     |
| 870828001      | TWAA           | B747            | JT9D             | C             | B                     | 7            | C                       | 4                     |
| 870410019      | NWAA           | DC10            | JT9D             | T             | B                     | 1            | C                       | 3                     |
| 870731006      | TWAA           | B747            | JT9D             | C             | B                     | 7            | C                       | 4                     |
| 870508015      | TWAA           | B747            | JT9D             | T             | B                     | 1            | C                       | 4                     |
| 871211007      | TWAA           | B747            | JT9D             | C             | B                     | 3            | C                       | 4                     |
| 870817089      | NWAA           | B747            | JT9D             | T             | B                     | 1            | C                       | 4                     |
| 870731013      | NWAA           | B747            | JT9D             | T             | B                     | 1            | C                       | 4                     |

| <u>SDR NO.</u> | <u>SUBMIT.</u> | <u>AIRCRAFT</u> | <u>ENG./LOC.</u>  | <u>COMPNT</u> | <u>FRAG.</u><br><u>TYPE</u> | <u>CAUSE</u> | <u>CONTN.</u><br><u>COND.</u> | <u>FLT.</u><br><u>COND.</u> |
|----------------|----------------|-----------------|-------------------|---------------|-----------------------------|--------------|-------------------------------|-----------------------------|
| 870821066      | TWAA           | B747            | JT9D              | T             | B                           | 7            | C                             | 3                           |
| 870828007      | PAAA           | B747            | JT9D              | C             | B                           | 7            | C                             | 4                           |
| 870403048      | NWAA           | B747            | JT9D              | T             | B                           | 2            | C                             | 4                           |
| 870626019      | NWAA           | B747            | JT9D              | T             | B                           | 2            | C                             | 3                           |
| 870731192      | PEXA           | B747            | JT9D              | T             | B                           | 7            | C                             | 5                           |
| 870817073      | NWAA           | B747            | JT9D/No.1         | T             | B                           | 2            | NC                            | 4                           |
| 871026020      | NWAA           | B747            | JT9D              | C             | B                           | 7            | C                             | 6                           |
| 870410007      | TWAA           | B747            | JT9D              | F             | B                           | 3            | C                             | 3                           |
| 870724079      | TWAA           | B747            | JT9D              | T             | B                           | 1            | C                             | 3                           |
| 870524014      | TWAA           | B747            | JT9D              | T             | B                           | 1            | C                             | 4                           |
| 870306054      | NWAA           | B747            | JT9D              | T             | B                           | 2            | C                             | 4                           |
| 870817066      | TWAA           | B747            | JT9D/UNK.         | F             | B                           | 2            | NC                            | 10                          |
| 870731192      | PEXA           | B747            | JT9D              | T             | B                           | 7            | C                             | 5                           |
| 870821038      | TWAA           | B747            | JT9D              | F             | B                           | 3            | C                             | 1                           |
| 880111165      | PEXA           | B747            | JT9D              | T             | B                           | 1            | C                             | 3                           |
| 880129008      | NWAA           | DC10            | JT9D              | T             | B                           | 7            | C                             | 3                           |
| 880208045      | PAAA           | B747            | JT9D              | T             | B                           | 7            | C                             | 3                           |
| 870918073      | PAAA           | B747            | JT9D              | T             | N                           | 7            | N                             | 3                           |
| 870529017      | TWAA           | B747            | JT9D              | F             | N                           | 3            | N                             | 7                           |
| 870505018      | TWAA           | B747            | JT9D              | F             | N                           | 2            | N                             | 4                           |
| 871113006      | PEXA           | B747            | JT9D              | C             | N                           | 7            | N                             | 4                           |
| 870727040      | NWAA           | B747            | JT9D              | C             | N                           | 7            | N                             | 4                           |
| 871120006      | NWAA           | B747            | JT9D              | C             | N                           | 3            | N                             | 4                           |
| 871009101      | NWAA           | B747            | JT9D              | T             | N                           | 5            | N                             | 5                           |
| 870717017      | TWAA           | B747            | JT9D              | F             | N                           | 2            | N                             | 4                           |
| 871207050      | EIAA           | B747            | JT9D              | F             | N                           | 3            | N                             | 5                           |
| 870925064      | UALA           | B767            | JT9D              | F             | N                           | 3            | N                             | 4                           |
| 870828012      | TWAA           | B767            | JT9D              | F             | N                           | 3            | N                             | 4                           |
| 880115016      | FTLA           | B747            | JT9D              | T             | N                           | 2            | N                             | 4                           |
| 870706054      | NWAA           | B757            | PW2037            | T             | B                           | 2            | C                             | 4                           |
| 870710001      | DALA           | B757            | PW2037            | C             | B                           | 2            | C                             | 4                           |
| 870522008      | DALA           | B757            | PW2037            | T             | B                           | 2            | C                             | 4                           |
| 871113009      | DALA           | B757            | PW2037            | T             | B                           | 1            | C                             | 4                           |
| 870807108      | SWIA           | EHB120          | PW118             | C             | N                           | 3            | N                             | 2                           |
| 870424023      | HNAA           | DHC8            | PW120             | T             | N                           | 2            | N                             | 3                           |
| 870514031      | AMWA           | SA226           | TPE331            | T             | B                           | 7            | C                             | 4                           |
| 870902133      | AMWA           | SA226           | TPE331            | T             | B                           | 7            | C                             | 7                           |
| 871009115      | WWMA           | SA227           | TPE331            | T             | B                           | 7            | C                             | 5                           |
| 871209041      | REXA           | JETSTM          | TPE331            | C             | N                           | 3            | N                             | 10                          |
| 870407026      | AMWA           | SA226           | TPE331            | C             | N                           | 3            | N                             | 7                           |
| 870707100      | SWIA           | SA226           | TPE331            | T             | N                           | 2            | N                             | 1                           |
| 870115095      | WWMA           | SA227           | TPE331            | C             | N                           | 3            | N                             | 3                           |
| 871123101      | WWMA           | SA227           | TPE331            | T             | N                           | 7            | N                             | 5                           |
| 870611215      | QXEA           | SA227           | TPE331            | C             | N                           | 3            | N                             | 7                           |
| 870902071      | MAAA           | SA227           | TPE331            | C             | N                           | 3            | N                             | 5                           |
| 870928022      | WRNA           | CL44            | TYNE-515/<br>No.1 | T             | B                           | 2            | NC                            | 5                           |
| 870508056      | WRNA           | CL44            | TYNE-515          | C             | N                           | 3            | N                             | 3                           |
| 870508053      | WRNA           | CL44            | TYNE-515          | T             | N                           | 2            | N                             | 1                           |
| 870612021      | REPA           | STCAPJC         | 501-D13           | C             | N                           | 3            | N                             | 4                           |
| 870327049      | MTRA           | STCAPJC         | 501-D13           | C             | N                           | 3            | N                             | 3                           |
| 870810139      | ASPA           | STCAPJC         | 501-D13           | C             | N                           | 3            | N                             | 5                           |

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| 870508007      | REPA           | STCAPJC         | 501-D13          | C             | R                           | 7            | C  | 4  |
| 870403065      | SPAA           | STCAPJC         | 501-D13          | T             | B                           | 2            | C  | 5  |
| 870724259      | SRAA           | 382G            | 501-D13          | C             | N                           | 2            | N  | 3  |
| 871001015      | HNSA           | 206B3           | 250C3            | C             | B                           | 2            | C  | 2  |
| 870609198      | SW62           | 206B            | 250C20           | C             | B                           | 1            | C  | 1  |
| 870601069      | SW62           | 206B            | 250C20           | C             | B                           | 7            | C  | 5  |
| 870601110      | SW62           | 206B            | 250C20           | C             | B                           | 7            | C  | 3  |
| 870610024      | EA25           | 206L            | 250C20           | C             | B                           | 7            | C  | 5  |
| 870714027      | EA11           | 206L            | 250C20           | C             | B                           | 1            | C  | 1  |
| 870916009      | GL61           | 206B            | 250C20           | C             | B                           | 7            | C  | 1  |
| 871231067      | SW62           | 206B            | 250C20           | C             | B                           | 7            | C  | 10 |
| 870702039      | GL61           | 206B            | 250C20           | T             | B                           | 2            | C  | 1  |
| 870720141      | SW62           | AS355           | 250C20           | T             | B                           | 7            | C  | 7  |
| 870408030      | SW62           | 206L            | 250C28           | T             | B                           | 7            | C  | 7  |
| 871224040      | SW62           | 206L            | 250C28/UNK.      | T             | D                           | 7            | NC                                       | 3  |
| 870519055      | GL01           | UNKNOWN         | 250C28           | C             | N                           | 7            | N  | 1  |
| 870519056      | GL161          | UNKNOWN         | 250C20           | C             | N                           | 7            | N  | 1  |
| 870618120      | SW62           | 206B            | 250C20           | C             | N                           | 3            | N  | 1  |
| 870512067      | WP07           | 369D            | 250C20           | C             | N                           | 7            | N  | 1  |
| 870604010      | WP07           | 369D            | 250C20           | C             | N                           | 3            | N  | 1  |
| 870624062      | WP07           | 369D            | 250C20           | C             | N                           | 3            | N  | 5  |
| 871203070      | WP13           | 206B            | 250C20           | C             | N                           | 2            | N  | 10 |
| 871203071      | WP13           | 206B            | 250C20           | C             | N                           | 2            | N  | 10 |
| 871208068      | WP06           | 206L            | 250C20           | C             | N                           | 2            | N  | 10 |
| 870902037      | GL61           | UNKNOWN         | 250C20           | T             | N                           | 1            | N  | 1  |
| 870902045      | GL61           | UNKNOWN         | 250C20           | T             | N                           | 1            | N  | 1  |
| 870902121      | GL61           | UNKNOWN         | 250C20           | T             | N                           | 1            | N  | 1  |
| 870908020      | GL63           | 369D            | 250C20           | T             | N                           | 7            | N  | 5  |
| 871224036      | GL61           | UNKNOWN         | 250C20           | T             | N                           | 1            | N  | 1  |
| 871231052      | NM67           | 206B            | 250C20           | T             | N                           | 2            | N  | 1  |
| 870115027      | SW64           | AS355           | 250C20           | C             | N                           | 3            | N  | 10 |
| 871203130      | SW64           | AS355           | 250C20           | C             | N                           | 2            | N  | 1  |
| 871027055      | SW62           | 206L            | 250C20           | T             | N                           | 1            | N  | 1  |
| 871110017      | SW62           | 206L            | 250C20           | T             | N                           | 1            | N  | 1  |
| 871014011      | SW62           | 206L            | 250C20           | T             | N                           | 2            | N  | 1  |
| 870803225      | NM64           | V107-2          | CT58             | C             | B                           | 7            | C  | 5  |
| 871202061      | NM64           | V107-2          | CT58             | T             | N                           | 4            | N  | 1  |
| 870610013      | S067           | 500             | JT15D/No. 1      | F             | D                           | 7            | NC                                       | 3  |
| 870609136      | GL62           | 550             | JT15D            | T             | B                           | 7            | C  | 10 |
| 870930017      | GL62           | LEAR 35         | TFE731           | T             | B                           | 7            | C  | 1  |
| 870908097      | GL19           | G50             | TFE731           | T             | B                           | 7            | C  | 5  |
| 870421035      | GL08           | LEAR 35         | TFE731           | T             | N                           | 7            | N  | 5  |
| 870930016      | GL62           | LEAR 35         | TFE731           | T             | N                           | 1            | N  | 1  |
| 870318043      | NM60           | 250             | CJ610            | C             | N                           | 3            | N  | 4  |
| 870428018      | CE64           | UNKNOWN         | CF700            | C             | N                           | 1            | N  | 1  |
| 870814099      | DCAA           | FALCON          | CF700            | C             | N                           | 3            | N  | 2  |
| 880115001      | DCAA           | FALCON          | CF700            | C             | N                           | 3            | N  | 3  |
| 870828019      | UALA           | DC8             | CFM56-2          | C             | B                           | 1            | C  | 5  |
| 870522002      | DALA           | DC8             | CFM56-2          | C             | B                           | 1            | C  | 4  |
| 870403055      | UALA           | DC8             | CFM56-2          | T             | B                           | 7            | C  | 5  |
| 870424053      | UALA           | DC8             | CFM56-2          | C             | N                           | 3            | N  | 3  |
| 871218111      | EIAA           | DC8             | CFM56-2          | C             | N                           | 3            | N  | 1  |

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|----------------|----------------|-----------------|------------------|---------------|-----------------------------|--------------|-------------------------------|-----------------------------|
| 870309006      | RAXA           | DC8             | CFM56-2          | F             | N                           | 3            | N                             | 1                           |
| 870417062      | ACLA           | B737            | CFM56-3          | F             | N                           | 3            | N                             | 4                           |
| 870220013      | ACLA           | B737            | CFM56-3          | T             | N                           | 5            | N                             | 7                           |
| 870828041      | USAA           | B737            | CFM56-3          | T             | N                           | 2            | N                             | 4                           |
| 871127028      | SWAA           | B737            | CFM56-3          | F             | N                           | 3            | N                             | 3                           |
| 871002050      | SWAA           | B737            | CFM56-3          | F             | N                           | 3            | N                             | 3                           |
| 870817027      | PAIA           | B737            | CFM56-3          | F             | N                           | 3            | N                             | 5                           |
| 871221008      | PAIA           | B737            | CFM56-3          | F             | N                           | 3            | N                             | 3                           |
| 870821030      | PAIA           | B737            | CFM56-3          | T             | N                           | 3            | N                             | 1                           |
| 871009092      | CKSA           | DC8             | JT3D             | C             | B                           | 1            | C                             | 5                           |
| 870424018      | ZIAA           | DC8             | JT3D             | C             | B                           | 1            | C                             | 4                           |
| 870925057      | RAXA           | DC8             | JT3D             | C             | B                           | 7            | C                             | 3                           |
| 871009098      | RAXA           | DC8             | JT3D             | C             | B                           | 7            | C                             | 3                           |
| 870803144      | RAXA           | DC8             | JT3D             | T             | B                           | 3            | C                             | 4                           |
| 870918016      | RAXA           | DC8             | JT3D             | T             | B                           | 2            | C                             | 3                           |
| 870831094      | RAXA           | DC8             | JT3D             | T             | B                           | 1            | C                             | 5                           |
| 870403060      | PCTA           | B707            | JT3D             | T             | B                           | 7            | C                             | 5                           |
| 870717057      | PCTA           | B707            | JT3D             | T             | B                           | 7            | C                             | 5                           |
| 870911018      | BUFA           | B707            | JT3D             | F             | B                           | 7            | C                             | 3                           |
| 871204067      | RAXA           | DC8             | JT3D             | T             | B                           | 7            | C                             | 5                           |
| 870427013      | ZIAA           | DC8             | JT3D             | T             | N                           | 7            | N                             | 3                           |
| 870917052      | ARWA           | DC8             | JT3D             | C             | N                           | 3            | N                             | 3                           |
| 870706039      | RAXA           | DC8             | JT3D             | C             | N                           | 2            | N                             | 3                           |
| 870306017      | RAXA           | DC8             | JT3D             | T             | N                           | 7            | N                             | 5                           |
| 870213005      | BUFA           | B707            | JT3D             | T             | N                           | 7            | N                             | 4                           |
| 870717048      | SRAA           | B707            | JT3D             | C             | N                           | 2            | N                             | 3                           |
| 870904071      | FWTA           | B707            | JT3D             | C             | N                           | 3            | N                             | 4                           |
| 870914046      | FWTA           | B707            | JT3D             | C             | N                           | 3            | N                             | 2                           |
| 870213020      | PAIA           | F28             | SPEY             | T             | B                           | 7            | C                             | 5                           |
| 870706038      | PAIA           | F28             | SPEY             | C             | B                           | 7            | C                             | 3                           |
| 870706030      | PAIA           | F28             | SPEY             | C             | B                           | 1            | C                             | 5                           |
| 870605127      | EMPA           | F28             | SPEY             | C             | B                           | 7            | C                             | 3                           |
| 870828048      | USAA           | BAC111-2        | SPEY             | C             | B                           | 2            | C                             | 3                           |
| 871030007      | USAA           | BAC111-2        | SPEY             | C             | B                           | 3            | C                             | 5                           |
| 871120002      | PAIA           | F28             | SPEY             | T             | N                           | 7            | N                             | 1                           |
| 870508006      | PAIA           | F28             | SPEY             | C             | N                           | 2            | N                             | 5                           |
| 870508012      | PAIA           | F28             | SPEY             | C             | N                           | 2            | N                             | 4                           |
| 870505004      | MPCA           | F28             | SPEY             | T             | N                           | 7            | N                             | 4                           |
| 880205153      | FLEA           | BAC111-2        | SPEY             | C             | N                           | 7            | N                             | 4                           |
| 870807049      | TWAA           | L1011           | RB211            | C             | B                           | 3            | C                             | 6                           |
| 870724135      | TWAA           | L1011           | RB211            | C             | B                           | 2            | C                             | 3                           |
| 870330102      | TAEA           | L1011           | RB211            | T             | B                           | 7            | C                             | 4                           |
| 880115148      | EALA           | L1011           | RB211            | T             | B                           | 7            | C                             | 4                           |
| 870629011      | TWAA           | L1011           | RB211            | C             | N                           | 7            | N                             | 4                           |
| 870522021      | TWAA           | L1011           | RB211            | C             | N                           | 3            | N                             | 4                           |
| 870515015      | AMTA           | L1011           | RB211            | C             | N                           | 7            | N                             | 5                           |
| 870626080      | HALA           | L1011           | RB211            | F             | N                           | 7            | N                             | 5                           |
| 870821039      | TWAA           | L1011           | RB211            | C             | N                           | 3            | N                             | 3                           |
| 870925203      | DALA           | L1011           | RB211            | T             | N                           | 2            | N                             | 1                           |
| 870612086      | AMTA           | L1011           | RB211            | T             | N                           | 7            | N                             | 5                           |
| 870612018      | UALA           | L1011           | RB211            | C             | N                           | 2            | N                             | 4                           |
| 870724130      | TWAA           | L1011           | RB211            | C             | N                           | 2            | N                             | 10                          |

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| 870824023      | TWAA           | L1011           | RB211            | C             | N                           | 2            | N                                  | 4            |
| 870717008      | ACLA           | BAE146-2        | ALF502           | T             | B                           | 2            | C                                  | 5            |
| 870313024      | PSAA           | BAE146-2        | ALF502/No.3      | T             | D                           | 7            | NC                                 | 5            |
| 870807069      | AWAA           | BAE146-2        | ALF502           | T             | B                           | 7            | C                                  | 5            |
| 870724002      | PSAA           | BAE146-2        | ALF502           | T             | B                           | 7            | C                                  | 5            |
| 870918124      | ASPA           | BAE146-1        | ALF502           | T             | N                           | 1            | N                                  | 2            |
| 870223174      | LLLA           | BAE146-1        | ALF502           | T             | N                           | 2            | N                                  | 1            |
| 870724222      | ACLA           | BAE146-2        | ALF502           | T             | N                           | 5            | N                                  | 5            |
| 871204002      | MPCA           | YS11A           | DART/No.1        | T             | B                           | 7            | NC                                 | 5            |
| 870320029      | SALA           | F27             | DART             | T             | B                           | 7            | C                                  | 2            |
| 870925069      | ANAA           | F27             | DART             | T             | B                           | 7            | C                                  | 8            |
| 871023073      | AWAA           | F27             | DART             | T             | B                           | 7            | C                                  | 8            |
| 870612081      | EALA           | A300            | CF6              | T             | B                           | 3            | C                                  | 5            |
| 871204031      | DALA           | DC10            | CF6              | C             | B                           | 2            | C                                  | 4            |
| 871113003      | AALA           | DC10            | CF6              | C             | B                           | 3            | C                                  | 6            |
| 871023011      | UALA           | DC10            | CF6              | C             | B                           | 7            | C                                  | 6            |
| 870410001      | AALA           | DC10            | CF6/No.1         | T             | B                           | 1            | NC                                 | 5            |
| 871113022      | UALA           | DC10            | CF6              | T             | B                           | 7            | C                                  | 4            |
| 871204087      | AALA           | DC10            | CF6              | T             | B                           | 7            | C                                  | 4            |
| 871204001      | WRLA           | DC10            | CF6              | C             | B                           | 3            | C                                  | 4            |
| 880122067      | UALA           | DC10            | CF6              | C             | B                           | 2            | C                                  | 10           |
| 871211158      | EALA           | A300            | CF6              | T             | N                           | 1            | N                                  | 1            |
| 871019026      | EALA           | A300            | CF6              | T             | N                           | 2            | N                                  | 10           |