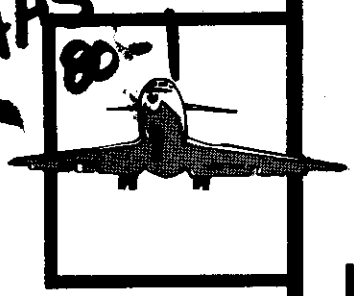

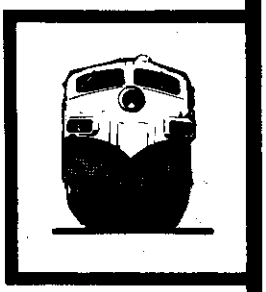

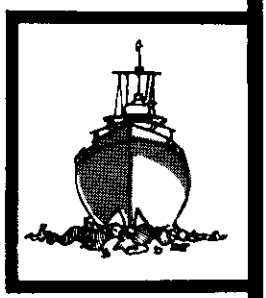

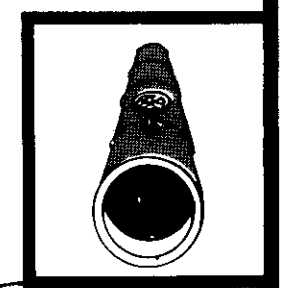

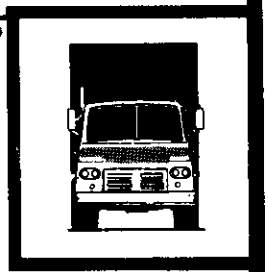

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

SPECIAL STUDY

COMMUTER AIRLINE SAFETY 1970-1979

NTSB-AAS-80-1

UNITED STATES GOVERNMENT

TECHNICAL REPORT DOCUMENTATION PAGE

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15. The National Transportation Safety Board has maintained a significant interest in commuter airline safety since the Board's creation in 1967. The Safety Board's involvement with commuter safety is reflected in accident reports, safety recommendations, and special studies which cover the period since 1970. In 1979, the Safety Board designated 14 CFR 135 enforcement and surveillance as a fiscal year 1980 safety objective. In October 1979, after a series of commuter accidents, the Board undertook a special study of commuter airline safety, and in January 1980, conducted a 4-day public hearing on the subject.

This study includes a review and analysis of the commuter airline industry accident history since 1972; an analysis of the predominant safety issues which affect the commuter airline industry; and a review of the relationship of the Federal regulators to the commuter airlines. The Safety Board developed the basis of the study from its 1972 special study of air taxis, the Board's accident statistics, and accident investigation experience, and from an extensive field survey.

The study discusses the operational, maintenance, training, and regulatory areas of the industry and analyzes safety deficiencies. The Board concludes that the basis to sound commuter airline safety must come from a coordinated program which includes the implementation of the new 14 CFR 135, Federal Aviation Administration surveillance and enforcement efforts, and a strong safety-oriented posture by commuter managers. Coupled with this program must be the permanent recognition by the Federal Aviation Administration of the commuter industry as an airline industry rather than as a segment of general aviation. Finally, the Safety Board makes a number of safety recommendations to the FAA designed to enhance the commuter airline industry.

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SPECIAL STUDY

COMMUTER AIRLINES SAFETY 1970-1979

Adopted: July 22, 1980

INTRODUCTION

Since its establishment in 1967, the National Transportation Safety Board has followed closely the safety posture of the commuter airline industry. Specifically, the Safety Board's work involving the commuter airline industry has centered on accident investigations and special studies, through which the Safety Board has identified areas where safety deficiencies exist. The Board has also supported administrative and regulatory changes designed to provide the appropriate level of Government activity required to achieve and maintain safety levels equivalent to those of certificated route air carriers.

In the 1960's, there was little difference in the nature of scheduled commuter airlines and on-demand air taxi companies, and the Board's early safety recommendations and investigations reflected the lack of differentiation. In 1971, a series of air taxi accidents prompted the Safety Board to conduct a special study of the air taxi/commuter airline industry. During the investigation and related public hearing, the Safety Board studied the differences in operations of the on-demand air taxi operators and the commuter airlines, as well as the adequacy of 14 CFR 135, "Air Taxi Operators and Commercial Operators." The work of the Safety Board was summarized in its Air Taxi Safety Study adopted September 27, 1972, (NTSB-AAS-72-9). The study resulted in 27 safety recommendations to the Federal Aviation Administration (FAA), the Civil Aeronautics Board (CAB), and the U.S. Postal Service. The first safety recommendation to the FAA, which addressed the inability of existing regulatory programs to assure adequate levels of operational safety, was:

> "Expedite redrafting of FAR 135 in its entirety, recognizing that commuter air carrier operators are separate entities from the smaller air taxi charter operators."(A-72-171)

Since 1972, the Safety Board has devoted increasingly more attention to commuter airline safety, because of the growth of industry both in numbers of commuter airlines and in total passengers transported, and because of the regular recurrence of safety deficiencies. After 1975, particularly between 1977 and 1979, there was an increase in the number of commuter accidents and in the number of resultant fatalities. (See figure 1.) The causes of the accidents were disturbing because they frequently revealed institutional safety deficiencies in operational, maintenance, and training programs rather than factors which were unique to

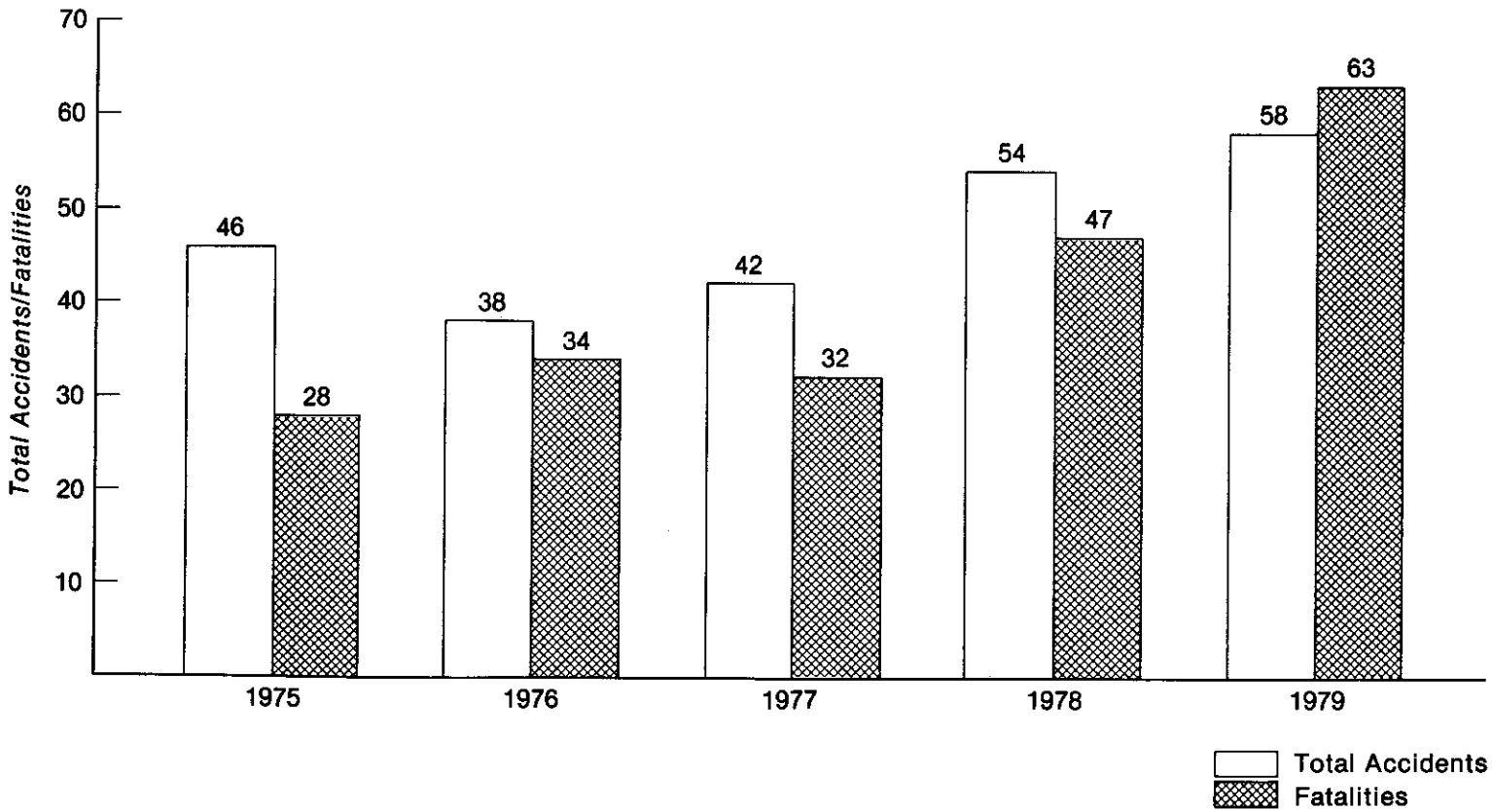

Figure 1.--U.S. Commuter Air Carriers Total Accidents and Fatalities 1975-1979 (1979 Preliminary).

individual operators. Moreover, the safety problems revealed by the Safety Board's accident investigations between 1975 and 1979 were similar in nature to the safety problems uncovered in its 1972 special study.

As a result, in 1979, the Board designated improvement in surveillance and enforcement of Part 135 operations by the FAA as a safety objective for fiscal year 1980. Specifically, the objective was to "convince the FAA to implement a program of enhanced surveillance and enforcement for Part 135 operators," with particular emphasis on commuter airline operators. The objective was selected because the problem, which was of national significance, had not been addressed as rapidly as possible, even though needed improvements were known, feasible, and could be effected in a timely manner. In order to fully explore the issue of commuter airline safety, the Safety Board decided in October 1979, to conduct a special study of commuter airline safety. The safety issues, identified for primary study in the Board's special investigation and en banc public hearing in January 1980, were:

1. Operational control, including operational management of the individual operators, dispatch functions, preflight planning, flight control, weight and balance procedures, and the implementation of approved operational programs by management and pilots.

2. Pilot training, workload, qualifications and selection, flight and duty times, and pilot relationship to management.

3. Maintenance issues, including airworthiness accountability, maintenance management, mechanic qualifications, availability and turnover of maintenance personnel, and training of maintenance personnel.

4. FAA surveillance of the commuter industry.

This study included a review and analysis of the commuter airline industry accident history since 1972; an analysis of the predominant safety issues which affect the commuter airline industry; and a review of the relationship of the Federal regulatory agencies with the commuter airlines. The Safety Board developed the basis of this study from its 1972 Air Taxi Study, accident statistics and accident investigation experience, an extensive field survey, and a 4-day en banc public hearing.

BACKGROUND

The Commuter Airline Industry

The commuter airline industry grew out of the on-demand air taxi general aviation service which had developed after World War II. The air taxi operators, who were exempted in 1938 from the economic and safety regulations that applied to scheduled carriers by Regulation 400-1 of the Civil Aeronautics Authority, were limited to operating aircraft which weighed less than 12,500 lbs. As a result, from the beginning, the air taxi and commuter industry was set apart from the scheduled airline industry by virtue of regulatory, economic, and equipment differences.

By 1949 the Civil Aeronautics Board (CAB) had granted a temporary exemption from economic regulation to all commercial operators of aircraft of 12,500 lbs or less. In 1952, the exemption became permanent in the form of 14 CFR 298. The air taxi industry, and thus the commuter industry, operated under this exemption until the enactment of the Airline Deregulation Act of 1978 (ADA).

Initially, the growth of the air taxi industry was hindered by the lack of permanent safety regulations. The industry had been regulated by Civil Air Regulation 42(a) until 1964, when 14 CFR 135, "Air Taxi Operators and Commercial Operators," was adopted. CAR 42(a) was a part of the operating regulations established for scheduled air carriers and adapted to the air taxi industry. Finally, the lack of aircraft designed specifically to be operated profitably over the route structures served by the commuter industry further inhibited its growth.

In the late 1950's, advancements in aircraft technology provided new equipment for the air taxis as well as for local service and scheduled air carriers. These advancements prompted many local service carriers to move out of smaller markets where newer aircraft could not be operated profitably. Competition from local service carriers was reduced further when permanent certification was granted to local service operators, who in turn looked to the larger markets formerly dominated by certificated route carriers.

In 1964, with the adoption of 14 CFR 135 by the FAA, the first permanent Federal safety standards for on-demand air taxi and commuter operators came into effect. Although Part 135 was less stringent than Part 121, which applies to air carriers, it was a permanent safety regulation and introduced an element of stability to the developing industry. The regulation, coupled with aircraft technology developments and reduced competition from local service carriers, gave impetus to the growth of the air taxi industry.

Operating authority for air taxis remained under 14 CFR 298. In 1969, the CAB amended Part 298 to define a "commuter airline" as:

> "An air taxi operator which (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week and places between which such flights are performed, or (2) transports mail by air pursuant to contract with the United States Postal Service."

This amendment marked the start of the rapid growth of the commuter industry. This new regulation following the promulgation of Part 135, the development of commuter-type aircraft--the Beech 99, the deHavilland Twin Otter and others--and the vacating of smaller markets by local service air carriers, enabled the commuter airline industry to establish itself as an integral part of the air transportation system.

By June 1971, 161 commuter airlines were transporting 4.3 million passengers annually. In 1978, 242 commuter airlines transported about 10.2 million

passengers; and in 1979, 258 commuter airlines provided passenger service to 12 million passengers. Ninety percent of all passengers transported were carried by the 150 largest commuter airlines. The 50 largest commuter airlines accounted for 83 percent of the 1979 commuter passenger enplanements.

Commuter airlines provided passenger service at about 604 airports in 1979, 362 of which were served exclusively by commuters. 1/ In contrast, U.S. certificated route air carriers served 344 airports, 102 of which were served exclusively by certificated route air carriers. The typical commuter airline now operates regionally and flies stage lengths which average 100 to 110 miles and about 48 minutes of flying time.

Between 1970 and 1979, the number of aircraft utilized by the commuter airline industry had grown from 687 to about 1,325. About 80 percent of the commuter airline fleet was multiengine aircraft and 24 percent was turbine aircraft. More than 60 percent of the commuter aircraft seat 9 passengers or less.

Commuter airlines initially were limited by CAB regulations to aircraft with a maximum takeoff weight of 12,500 lbs or less and 10 passenger seats or less. The 1972 amendments of Part 298 permitted the use of aircraft which would seat up to 30 passengers and carry a payload of 7,500 lbs. After the ADA the CAB again amended Part 298 to permit commuter airlines to operate aircraft with a seating capacity of 60 and a maximum payload capacity of 18,000 lbs. As a result, the commuter airline industry now includes many companies which operate both large and small aircraft. If the company holds an Air Carrier Operating Certificate and operates under the rules of 14 CFR 135, it operates aircraft which are 30 passenger seats or less or 7,500 lbs. or less under 14 CFR 135 and aircraft which have 31 passenger seats or more or greater than a payload of 7,500 lbs. under 14 CFR 135.2, "Air Taxi Operations with Large Aircraft." This Part directs the carrier to operate its large aircraft under the rules of Part 121, which also apply to supplemental air carriers. While operation of large aircraft is governed by Part 121, the small aircraft operations fall under 14 CFR 121.9, which directs the commuter to operate small aircraft under the requirements of 14 CFR 135. Consequently, the term "commuter" covers a broad range of airlines which operate many types and sizes of aircraft. Some large 2/ and medium commuters airlines are now conducting operations and programs under 14 CFR 121 which are equal in sophistication to U.S. certificated route air carriers. Since commuter airlines and certificated route air carriers are operating similar equipment and are following similar operating practices, the type of route structure soon may be the only difference between many of the large and medium commuter airlines and certificated route air carriers. However, 14 CFR 135 will remain the operating standard for most small and medium commuter airlines.

1/ FAA and CAB figures on the total number of airports are higher, but they reflect airports which have only cargo or airmail service.

2/ For the purpose of the study the following criteria were generally applied: Large commuter - More than nine aircraft flown more than 10,000 hours and more than 12,000 departures. Medium commuter - Five to nine aircraft flown between 8,500 hours and 10,000 hours and between 8,000 departures and 12,000 departures. Small commuters - Less than five aircraft flown fewer than 8,500 hours and less than 8,000 departures.

During the 1970's, the commuter airline industry grew both in stature and numbers. The impact of replacement service became significant as a result in the ADA as the certificated route air carriers dropped less profitable routes, and commuter airlines were formed or expanded to fill the transportation void. In the 12 months after the passage of the ADA, 50 cities lost certificated route air carrier service. In each instance replacement service was provided by a commuter airline. Between 1965 and 1978, 172 cities lost certificated route air carrier service, in 140 of these cities scheduled air transportation was continued by commuter airlines.

In many instances, as commuter airlines moved into former certificated route air carrier markets, visible differences between the two virtually disappeared. The lack of distinction between the commuter airline carrier and the certificated route air carrier has resulted from (1) the close association of some commuters with certificated route air carriers; (2) interline agreements between commuters and certificated route air carriers, whereby the latter will ticket and handle baggage for passengers who connect with commuter flights; (3) integrated listings in the Official Airline Guide; and (4) the routine referral of passengers by travel agents and certificate route air carrier's to the commuter airlines. As a result, passengers have come to expect the level of service and safety from the commuter airline equivalent to that offered by the route air carrier. While the association with the certificated route air carriers has been to the advantage of the commuters, in many cases, the individual passenger is not aware of the regulatory, equipment, and facilities differences between the certified route air carriers and commuter airlines.

For the 1980's, the FAA has forecast a 96-percent increase in commuter airline operations and a 116-percent increase in passenger enplanements over similar figures of the 1970's. Additionally, the development of new commuter light transport aircraft, the loan guarantee provisions of the ADA, and the commuter airport development potential of new ADAP legislation will serve to promote the growth of the commuter airline industry.

Government Regulation

Federal Aviation Administration.—The FAA is responsible for the safety regulation of commuter airlines. As the air taxi service industry developed in the 1950's and 1960's, the FAA treated it as a segment of general aviation. FAA surveillance of certificated route air carriers, which were regulated specifically by 14 CFR 121, was assigned to FAA Air Carrier District Offices (ACDO's) in the FAA region and accomplished by air carrier inspectors. Channels of authority were established through regional offices to Washington headquarters so that regulatory, staffing, and policy programs could be coordinated. These inspectors were trained specifically for certificated route air carrier operations and were not assigned general aviation duties. On the other hand, FAA surveillance of on-demand air taxi and commuter airline operators was assigned to the FAA General Aviation District Offices (GADO's). FAA inspectors assigned the responsibility for the commuters operating under 14 CFR 135 were general aviation inspectors. In addition to the surveillance of the expanding Part 135 industry, the GADO inspectors continued to be responsible for the full range of general aviation activities they had previously been assigned.

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The growth of the commuter/air taxi industry after 1969 and a series of accidents involving Part 135 operators prompted the Safety Board's study of the industry in 1972. One significant finding of the study was that 14 CFR 135 did not provide an acceptable level of safety to the traveling public. The Safety Board concluded that the regulations required revision to correct deficiencies found during the study and directed 20 recommendations to the FAA. These addressed, in part, the need to revise Part 135, commuter management and pilot qualifications, maintenance programs and procedures, flight and duty time, and operational programs. (See appendix A.) The Safety Board also urged the FAA to recognize commuter airlines as "separate entities" from the on-demand air taxi operators and to revise Part 135 accordingly. The latter recommendation was based on the conclusion that the commuter airline industry was evolving into an integral part of the air transportation system, and that it should be administered as an air carrier and not as an element of general aviation. A second finding of the study was that FAA surveillance of commuter airlines was inadequate. The Safety Board recommended that the FAA standardize surveillance techniques, provide specialized training to GADO inspectors, and assign FAA principal inspectors to commuter operators whose primary duty was the surveillance of commuter airlines.

On December 27, 1972, the FAA responded to the 20 recommendations. In general, most of the recommendations were acceptable to the FAA, and programs to implement the Safety Board's recommendations were cited in the FAA's response. The redrafting of 14 CFR 135, which was the most important regulatory recommendation, was accepted by the FAA; and according to the FAA, in 1972, a program had already been initiated to redraft Part 135. To the recommendation that the FAA standardize surveillance techniques, the FAA responded that standardization of surveillance was accomplished by "appropriate handbooks and reporting forms." In addition, FAA officials believed ". . . assignment of principal inspectors to commuter air carriers is desirable. However, we are unable to do this at the present time because of insufficient staffing; when sufficient numbers of inspectors become available principal inspectors will be assigned."

In 1972, the Safety Board was assured by the FAA of its intent to improve the surveillance of commuter air carriers. However, the FAA took no action and therefore in 1975, 1978, and 1979 the Board again made safety recommendations on these same subjects after accident investigations indicated that FAA surveillance of some commuter air carriers was inadequate to provide an acceptable level of safety.

Between 1972 and 1978, the FAA continued to reply to Board safety recommendations, concerning commuter safety that the "new" Part 135 would address the safety issues raised by the recommendations. As a result, during this period many interim measures were taken by the FAA to correct safety deficiencies, but final positive regulatory action continued to be postponed in favor of the adoption of new Part 135.

In the 6-year period while Part 135 was being revised, several of the issues originally cited in the 1972 Safety Board recommendations were referenced in the causal area of commuter airline accident reports. Corrective action which was ultimately incorporated into the new Part 135 and adopted in December 1978, included, in part, requirements regarding management qualifications, airline

transport pilot ratings, upgrading of training and maintenance manuals, and a revision of maintenance procedures. However, despite the acknowledgement by the FAA of the need to revise Part 135 and safety deficiencies found during commuter accident investigations during the period, the progress in redrafting Part 135 was slow. This lack of responsiveness was recognized by the FAA Administrator, who, on January 16, 1980, stated:

> "I made it my first priority, when I took over the FAA in 1977, to create a regulatory structure that would accommodate this growth with safety. This was Part 135, which had been languishing in the bureaucracy for years. Part 135 was the most comprehensive rulemaking action the FAA had ever undertaken and putting it in place cost all of us immeasurable amounts of time and money. But the job is done at last, and now we have a framework of regulations capable of providing a level of safety for commuters comparable to that of the large carriers--if those regulations are followed conscientiously."

The Part 135 that was adopted in December 1978 is a significant improvement over its predecessor and, for the most part will provide for an adequate level of safety for commuter operators. However, despite the built-in delays of the Administrative Procedure Act, the time required to promulgate the regulation was excessive, and it resulted in many safety issues not being addressed until 6 years after the Safety Board initially recommended the improvements.

Upon adoption of the new Part 135, the FAA launched a comprehensive recertification program of on-demand air taxis and commuter air lines. The recertification program required an inspection of all Part 135 certificate holders (about 3,600 including on-demand air taxis and commuter airlines) to insure that all requirements of Part 135 were being implemented. Additionally, FAA Notice 8000.176, Increased Surveillance for Operators Under New Part 135, was issued on April 25, 1979. The Notice put into effect a greatly increased surveillance programs for each Part 135 operator for the year following the recertification of the carrier under the new Part 135. The Notice prescribed surveillance procedures and stated that "upgrading of air taxi/commuter safety has the highest priority within Flight Standards. . . ." The increased surveillance program was to be in effect for 1 year. On May 30, 1980, the provisions of the Notice were extended until December 1, 1980. With this Notice, the FAA made a positive commitment to regard commuter airlines as a segment of the air transportation industry rather than as an element of general aviation.

Civil Aeronautics Board.--The CAB has statutory responsibility for the economic regulation of the U.S. certificated route air carriers. In addition to issuing 14 CFR Part 298, "Classification and Exemption of Air Taxi Operators," which treats commuter airlines separately from on-demand air taxi operators, the CAB has also limited the size of the aircraft commuter air carriers may operate to 60 seats or less and to a maximum payload capacity of 18,000 lbs. Under Part 298, commuter airlines are exempt from many of the statutory requirements, including

certification, which are imposed on certificated route air carriers. Commuter airlines are required to register with the CAB and carry specific amounts of liability insurance. In addition, they must file schedules and periodic traffic reports with the CAB.

Before passage of the ADA, the CAB consistently maintained that the FAA was responsible for aviation safety while the CAB was responsible for economic regulation. A CAB witness at the 1972 Safety Board public hearing on air taxi safety expressed this position. 3/ The witness stated that the CAB looked to the FAA to establish and enforce or administer safety standards for the operational aspects of air transportation. This basic position was reiterated in a 1974 letter from the CAB Chairman to the Safety Board Chairman and had been upheld judicially. 4/

With passage of the ADA, the movement of commuter airlines into the market was accelerated because economic regulation of the airline industry was relaxed. However, Congress clearly stated that it did not intend changes in economic regulation to be accomplished at the expense of safety. The Act's declaration of policy placed new emphasis on safety by directing the CAB to consider in the discharge of its duties:

> (1) The assignment and maintenance of safety as the highest priority in air commerce. Before authorizing new air transportation services, the CAB is to evaluate fully the recommendations of the Secretary of Transportation as to safety implications of such new services and to evaluate fully any report or recommendation submitted under section 107 of the Act.
>
> (2) The prevention of deterioration of established safety procedures. The CAB is to recognize the clear intent, encouragement, and dedication of the Congress to the furtherance of the highest degree of safety in air transportation and air commerce and to maintain the safety vigilance which has evolved within air transportation and air commerce and has come to be expected by the traveling and shipping public.

Of great significance to the commuter industry was the provision of the ADA entitled "Small Community Air Service Guaranteed Essential Air Transportation." This provision was prompted by the concern that airline deregulation would result in the curtailment or abandonment of service vital to the well being of small communities. The section defined an "eligible point" as any place in the United States to which, on the date of enactment (October 24, 1978), an air carrier either provided service pursuant to a certificate or was authorized by a certificate to provide service even though service had been suspended.

With respect to each "eligible point" which either had no service or was served by only one certificated air carrier, the CAB had to determine its "essential

3/ Mr. Alphone M. Andrews, Director, Bureau of Operating Rights (TR. 25)
4/ Air Line Pilots Association, International V. CAB, 494 F 2d 1118 (D.C. Cir. 1974).

air transportation" needs. "Essential air transportation" was the minimum level of service that would be guaranteed for 10 years to qualifying eligible points. A certificated carrier would have to give CAB at least 90 days advance notice of a contemplated reduction in service below the CAB-established level of essential air transportation. If the CAB could not find another air carrier to provide at least essential service, the CAB would require the existing carrier to continue service, with subsidy if necessary, while the CAB found a replacement.

This section of the ADA also has a "level of safety" feature which provides, in part:

> ". . .the Board shall not provide any compensation under this section to any commuter air carrier to provide service to any eligible point, and the Board shall prohibit any commuter air carrier from providing service to any eligible point, unless the Board determines that such commuter air carrier--
>
> (A) is fit, willing and able to perform such service; and
> (B) that all aircraft which will be used to perform such service and all operations relating to such service will conform to the safety standards established by the Administrator under paragraph (3) of this subsection."

In summary, the ADA altered significantly the role of the CAB in respect to commuters airlines. For the first time, commuters were subject to a CAB fitness determination. Under the former substitution/suspension arrangements, the certificated carrier was ultimately responsible for providing the service. Now, the CAB is obligated to find air carriers who are available to fulfill the statutory guarantee of essential service. In this capacity, the CAB must rely increasingly on the commuter airline industry for replacement service before a certificated carrier is allowed to exit unwanted markets.

To make the fitness determinations required by ADA, the CAB and the FAA have entered into a formal agreement to provide a mutual exchange of information. By the terms of this agreement, upon request, the FAA will furnish the CAB with safety evaluations of applicants for new authority and carriers seeking to provide essential service. Upon request, the CAB will provide the FAA financial data on carriers. The Safety Board was advised that CAB has shared with the FAA the results of some commuter audits. Such information could assist the FAA in directing its surveillance program by identifying operators with financial difficulties or those who are growing rapidly--conditions which could affect the ability of a carrier to maintain safe operations. The agreement also establishes an interagency working group to facilitate close cooperation, although it is yet to be completely implemented.

Although the fitness determination that the CAB must make includes a judgment as to the commuter airlines ability to operate safely, the CAB still

divorces itself completely from evaluating the safety of an operator. Although the CAB, in 1979, began to study methods of assessing operator safety, it defers to the FAA on the issue of safety.

The FAA evaluations provided to the CAB on the safety capabilities of an operator have been based on the presumption that, if the operator is currently operating under an Air Carrier Operating Certificate, it is operating safely. The rationale is that if the carrier was not operating safely the FAA would suspend the operating certificate. For example, an FAA response to a CAB request for a safety and compliance evaluation of four commuter airlines which was typical of most FAA responses reviewed, stated:

> "All of these operators are currently certified by the Federal Aviation Administration and are conducting their operations in accordance with the air taxi rules of Part 135 of the Federal Aviation Regulations. We know of no reason why the Board should act unfavorably on this application."

At the end of January 1980, no commuter airlines had received an adverse safety and compliance evaluation from the FAA. Since January 1980, the FAA has expanded the scope of the reports which are sent to the CAB to provide the CAB more background and current information upon which to make fitness decisions.

Accident Statistics

The accident statistics used in this study were collected from 1975 through 1979 and apply to commuter airlines and U.S. certificated route air carriers. The total number of commuter airlines accidents increased from 48 in 1975 to 58 in 1979. (See Table 1.) During the same period, the number of fatalities in commuter airline accidents increased from 28 to 63. The accident rate, based on 100,000 departures, was 2.61 accidents per 100,000 departures for commuters in 1975, 2.22 accidents in 1976, 2.08 accidents in 1977, 2.58 accidents in 1978, and 2.04 accidents in 1979. (See figure 2.) This rate, which affords the most favorable comparison for commuter airlines, shows that the commuter accident rate based on departures is nearly 5 times higher than the certificated route air carrier rate for each of the years analyzed, and at least 6 times higher than the rate for local service air carriers.

During the 1975-1979 period, the total number of accidents for certificated route air carriers fell from 30 to 19. Local service air carriers average 4 every year. The accident rates for certificated route air carriers, based on 100,000 departures, were .638 accidents in 1975, .455 accidents in 1976, .405 accidents in 1977, .379 accidents in 1978, and .376 accidents in 1979. The same accident rates for local service air carrier were .209 accidents in 1975, .355 accidents in 1976, .280 accidents in 1977, .203 accidents in 1978, and .272 accidents in 1979.

The 238 commuter airline accidents between 1975 and 1979 resulted in 204 fatalities. These accidents involved about 1,100 passengers and crewmembers. Forty-nine percent of the accidents occurred on an airport and 57 percent occurred

U.S. Commuter Air Carriers
U.S. Certificated Route Air Carriers
U.S. Local Service Air Carriers
Scheduled Passenger and Cargo Service

Accident	1975			1976			1977			1978			1979		
	Commuter	Certificated	Local Service	Commuter	Certificated	Local Service	Commuter	Certificated	Local Service	Commuter	Certificated	Local Service	Commuter	Certificated	Local Service
Total	46	30	3	38	22	5	42	20	4	54	19	3	58	19	4
Fatal	12	2	0	11	2	0	9	2	1	13	4	0	14	5	1
Fatalities															
Passenger	13	113	0	20	36	0	21	64	60	34	13	0	48	321	1
Crew	13	9	0	10	2	0	11	5	2	13	2	0	15	26	1
Other	2	0	0	4	0	0	0	9	8	0	1	0	0	3	0
Total	28	122	0	38	32	0	22	78	70	47	16	0	63	350	2
Accident Rate Per 100,000 Hours Flown[1]															
Total	4.06	.553	.344	3.53	.394	.569	3.15	.345	.435	3.96	.315	.301	3.25	.295	.333
Fatal	0.85	.037	.000	1.04	.036	.000	0.61	.052	.109	0.93	.066	.000	0.87	.078	.083
Accident Rate Per 1 Million Hours Flown[1]															
Total	0.24	.013	.011	0.20	.009	.018	0.19	.008	.014	0.23	.008	.009	0.19	.007	.011
Fatal	0.05	.001	.000	0.06	.001	.000	0.04	.001	.003	0.05	.002	.000	0.05	.002	.003
Accident Rate Per 100,000 Departures[1]															
Total	2.61	.638	.209	2.22	.455	.355	2.08	.405	.280	2.58	.379	.203	2.04	.376	.272
Fatal	0.55	.043	.000	0.65	.041	.000	0.40	.061	.070	0.61	.080	.000	0.55	.099	.068

[1]Commuter rates exclude accidents involving operators not reporting traffic data to CAB.

Table 1.--Accidents, Fatalities, and Rates.

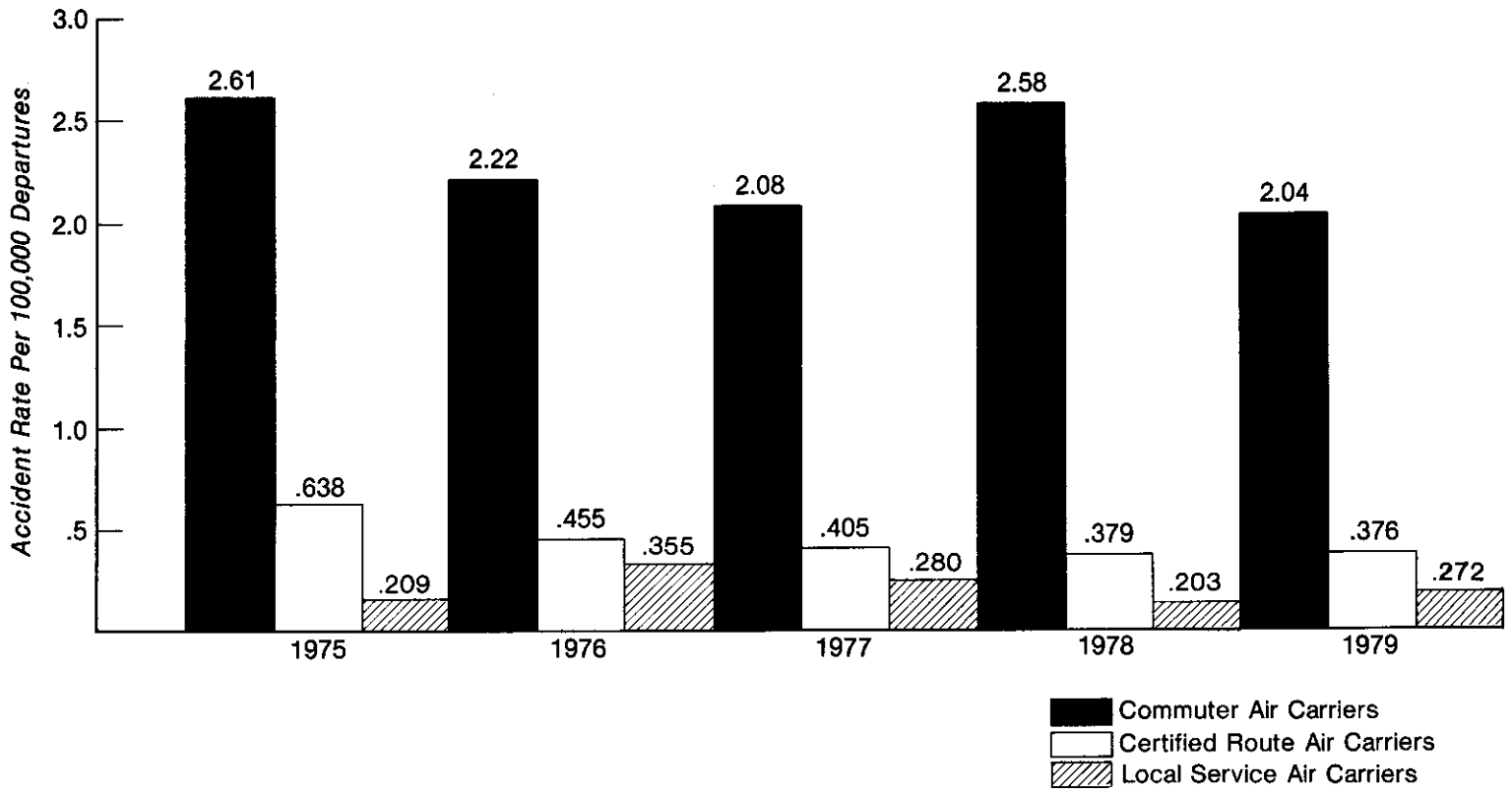

Figure 2.--U.S. Commuter Air Carriers, U.S. Certificated Route Carriers, Local Service Air Carriers Accident Rate Per 100,000 Departures 1975-1979 (1979 Preliminary).

on or within 1/4 mile of an airport. About 74 percent of the accidents occurred during VFR conditions.

About 41 percent of the accidents occurred during some phase of the approach, landing, or landing roll. About 28 percent of the accidents occurred during the taxi to takeoff, takeoff, or initial climb, while about 17 percent occurred during normal cruise.

Table 2 shows the qualifications of the pilots involved in accidents from 1975 through 1978.

Field Survey

Between October 1979 and January 1980, a survey of selected commuter airlines and review of historical data were conducted by the Safety Board. The purpose of the work was to: (1) review past accident investigations, statistics, data, and recommendations; (2) identify the safety issues and problems that affect the commuter airline industry; (3) establish a base of information concerning commuter airline flight operators, maintenance, and pilot training programs; (4) develop a base of information on management in the commuter airline industry; and (5) study the roles and effectiveness of the FAA and the CAB. During the survey and review, the Safety Board was assisted by the CAB, the FAA, the Air Line Pilots Association, the Union of Professional Airmen, the Commuter Airline Association of America, the National Air Transportation Association, the International Association of Machinists, and representatives of many individual commuter airlines.

The Safety Board visited 45 commuter airlines throughout the United States to survey their management of the operational, maintenance, training, equipment, and safety programs, and to discuss the needs of the industry. These operators represented about 35 percent of the passenger enplanements of the commuter airline industry for 1978. The carriers were essentially selected at random; however, care was taken to insure a geographical mix as well as a fair representation of large, medium, and small commuter airlines. The sample did include 5 of the 10 largest commuters, and 10 of the 25 largest commuters. All the operators surveyed were engaged primarily in passenger operations.

The Safety Board reviewed accident files and transcripts involving FAA surveillance and enforcement activities in commuter airline accident investigations. Several FAA Flight Standard District Offices (FSDO's) and GADO's were visited, and regional management officials were interviewed. The Safety Board also interviewed FAA personnel in the Washington, D.C., headquarters, in order to assess the FAA's current surveillance and enforcement program for 14 CFR 135 operators, and to evaluate its manpower, staffing, workload, and standardization of procedures at its GADO's and FSDO's. Finally, the survey and review addressed the airport environment, the commuter airline market, commuter airline management, past safety recommendations, and accident statistics.

Table 2.--Selected Accident Data
Commuter Air Lines
1975 - 1978

Pilot Certificate	Accident Records Fatal	Accident Records Nonfatal	Percent of Total
Commercial	17	55	39.78
Commercial with Flight Instructor	6	22	15.47
Airline Transport	13	42	30.39
Airline Transport with Flight Instructor	8	17	13.81
Unknown/Not Reported	1	0	.55
Total	45	136	100.0
Pilot Total Time			
0 - 25 Hours	0	0	0
26 - 50 Hours	0	0	0
51 - 100 Hours	0	0	0
101 - 300 Hours	0	0	0
301 - 500 Hours	0	1	.55
501 - 1000 Hours	0	1	.55
1001 - 3000 Hours	12	44	30.94
3001 - 5000 Hours	14	38	28.73
5001 - 8000 Hours	10	22	17.68
8001 - 10,000 Hours	2	8	5.52
Over - 10,000 Hours	5	21	14.36
Unknown/Not Reported	2	1	1.66
Total	45	136	100.00
Pilot Time in Type Aircraft			
5 - Or Less Hours	0	1	.55
6 - 25 Hours	1	1	1.10
26 - 50 Hours	2	6	4.42
51 - 100 Hours	1	8	4.97
101 - 300 Hours	11	22	18.23
301 - 500 Hours	4	18	12.15
501 - 1000 Hours	5	25	16.57
1001 - 2000 Hours	7	21	15.47
2001 - 3000 Hours	4	13	9.39
Over - 3000 Hours	8	18	14.36
Unknown/Not Reported	2	3	2.76
Total	45	136	100.00

Public Hearing

Beginning January 28, 1980, the Safety Board held a 4-day public hearing in Washington, D.C., to explore commuter airline safety problems, with the full Board serving as the Board of Inquiry. The Chairman of the National Transportation Safety Board was the presiding officer.

Forty witnesses testified and engaged in lengthy, in-depth question and answer exchanges on commuter airline safety issues. Panels of witnesses discussed the role of the FAA and the CAB, the public perception of the commuter airline industry, flight operations, maintenance, pilot training and workload, commuter airline equipment, financial considerations, and Alaskan operations.

SAFETY IN THE COMMUTER AIRLINES INDUSTRY

The commuter airline industry is an integral part of the air transportation industry and, as such, must provide an acceptable level of service and safety to the public. The Safety Board believes that a high level of safety is the primary responsibility of the industry itself, and that government surveillance and regulations can not, by themselves, assure commuter airline safety. However, the FAA and the CAB must provide the regulatory framework, programs, and assistance to allow the responsible development of safety practices within the industry. Finally, the FAA must provide surveillance of commuter airlines and enforcement of safety regulations to insure compliance with safety standards and to detect those operators or individuals who attempt to evade the regulations.

Federal Aviation Administration

FAA regulatory, surveillance, and enforcement activities, as well as the activities and programs of individual commuter airlines, affect the level of safety of the commuter airline industry. Although the work of the FAA affects every aspect of commuter airlines, its effects are most apparent at the GADO inspector level, where surveillance is conducted, and at FAA Washington headquarters, where regulations are formulated. In addition, the FAA administers the initial certification of each commuter airline, during which programs, procedures, and management structure must be approved before revenue operations begin.

From 1964 until the adoption of the new Part 135 in December 1978, the FAA did not see the need to separate regulation of commuter airlines from the on-demand air taxi, and it did not anticipate the commuters airline's role in filling the air transportation needs of the short haul, small city passenger. The FAA's emphasis in respect to air transportation was on the certificated route air carriers.

The FAA was slow to recognize the commuter airline industry as an air transportation industry or to devote the necessary manpower, resources, and assistance to overseeing its activity. The FAA (1) had grouped commuter and on-demand air taxi operators with general aviation, (2) conducted surveillance of commuter airlines with general aviation inspectors from GADO's, (3) took 6 years to complete the revision of 14 CFR 135 published on December 1, 1978, (4) did not recognize that commuter airlines were distinct from on-demand air taxi operators,

(5) assigned the surveillance and enforcement of safety regulations affecting a large number of on-demand air taxi and commuter line operators to already heavily burdened general aviation inspectors , which precluded adequate surveillance of commuter airline operators, and (6) allowed commuter airlines to utilize aircraft certificated under 14 CFR 23 - Airworthiness Standards: Normal, Utility, and Acrobatic Category Airplanes -- rather than under 14 CFR 25, which applies to transport category airplanes.

From 1970 through 1978, Safety Board recommendations, commuter airline accident rates, total numbers of commuter accidents and fatalities, and the accident cause/factors which indicated serious safety problems should have prompted the FAA to take measures to correct deficiencies. In addition, the growth of the commuter industry in the 1970's should have prompted the FAA to recognize the need to view the industry in a new perspective. Finally, the FAA failed to recognize that the ADA would bring about significant changes in the air transportation industry which would increase the workload of FAA inspectors substantially.

The Safety Board realizes that Part 135 and Part 121 necessarily do not provide identical standards of air transportation safety. It believes, however, that the full implementation of Part 135 and a responsible effort by the commuter industry can result in an improved level of commuter airline safety that will approach the level of safety of certificated route air carriers. The increased surveillance effort initiated by FAA Notice 8000.176 is a good foundation for establishing an ongoing, comprehensive surveillance program. The FAA should build on the experience gained from the enhanced surveillance program to expand the scope of its understanding of the problem areas brought to light in the Board's field study and in its public hearing. However, the Board's field study and public hearing, as well as its accident investigation experience, indicate that in spite of the FAA progress, there remain areas in the FAA's efforts which require improvements.

GADO Workload and Surveillance.--On September 8, 1977, an FAA spokesman appeared before the Government Activities and Transportation Subcommittee of the House Committee on Government Operations to testify on airline deregulation and aviation safety. He stated that he did not believe additional manpower would be required to cope with commuter airline expansion resulting from deregulation. At the same hearing, an August 5, 1977, a memo from the General Aviation Division to the Flight Standards Service was read into the record. It stated:

> "To reiterate, the agency does not now have the resources to cope with the problems that sudden deregulation would present. Further, a considerable lead time would be necessary in assuring training of any additional personnel authorized before we would be operationally geared to handle the increased workload caused by deregulation."

Despite all the indicators that the commuter airline industry had grown to the point where specific surveillance programs were required and the belief by some FAA personnel that manpower resources were not adequate, FAA managers

maintained that no additional manpower, resources, or regulatory efforts were needed. The 1-year surveillance program established by FAA Notice 8000.176, coupled with the increase in the number of commuter operators and the recertification of all air taxis and commuters, placed an even heavier workload for the FAA GADO inspectors.

As early as May 1972, the Safety Board had recommended that the FAA increase the staffing levels of GADO's to insure adequate surveillance. This recommendation was repeated in 1978 and 1979. Safety Board investigations revealed that the workloads of FAA inspectors assigned to commuter airline operators were extremely heavy. For example, the investigation of a September 1977 accident involving an Alaska Aeronautical Industries DHC-6 revealed that the FAA principal operations inspector for that airline was responsible for 58 commuter and on-demand air taxi operators. The maintenance inspector for Universal Airways, which had an accident on March 1, 1979, was responsible for 36 other commuters and on-demand air taxis. The accident data and the results of the Safety Board's field survey on this subject indicate that there are too few FAA inspectors assigned to commuter airlines. In fact, one commuter operator testified that in South Carolina there was only 1 FAA maintenance inspector for 37 commuter and air taxi operators, and that he was often not accessible when assistance was required. (Since January 1980, a second maintenance inspector has been hired for the South Carolina area.)

In addition to inadequate manpower levels, GADO manning levels frequently were not consistent on a geographical basis nor in relation to the size of the commuter airline. Generally, the larger commuters and commuters located in major population areas were visited frequently by FAA inspectors, while the small commuters and commuters in rural areas were visited infrequently. Adequate manpower is required if a surveillance program is to be effective. As a result, on May 17, 1978, the Safety Board issued recommendation A-78-38.

> Identify FAA offices responsible for the surveillance of large numbers of air taxi/commuter operators and insure that an adequate number of inspectors are assigned to monitor properly each operator. (Class II, Priority Action) (A-78-38)

Until 1979, the FAA Administrator had maintained that all GADO workload requirements could be satisfied with existing manpower levels and that increased commuter airline surveillance and wholesale recertification could be conducted adequately without increases in personnel. However, FAA GADO inspectors have testified at several Safety Board accident investigation public hearings that to accomplish GADO workload requirements this position requires loose interpretation of what comprises adequate surveillance and how work schedules are constructed. In one case, an "adequate" commuter surveillance program consisted of one surveillance visit to a maintenance facility every 60 to 90 days, as confirmed by the maintenance inspector at Universal Airways. The Antilles Airboats, Inc., principal maintenance inspector visited the airline about once a month, while the operations inspector from the Anchorage GADO was hard-pressed to inspect some of his carriers more than once a year. The workload tasking of Houston GADO-5,

which had 12 general aviation inspectors, indicated there were more than 25 aeronautical activities which it had to accomplish. These included, in part, surveillance of 4,222 aircraft, 13,037 certificated pilots, 71 air taxis and commuters, 264 executive operators, 120 pilot/ground schools, 160 repair stations, 84 agricultural operators, 59 pilot examiners, 890 flight instructors, and 1,000 certificated mechanics. FAA inspectors and others stated that they have considerable difficulty accomplishing all the workload requirements and commuter airline surveillance. A supervisor at one district office stated that the proper surveillance of the two commuters in his district would take the full time of one maintenance inspector. However, each inspector was required to accomplish a wide range of general aviation duties and still maintain commuter airline surveillance activities. The Safety Board maintains that the GADO inspectors generally have an unreasonably heavy workload and that, as a result, safety can be derogated.

In a September 25, 1979, letter to the Chairman of the National Transportation Safety Board, the FAA Administrator described the recently strengthened surveillance program and stated:

> "I have reviewed the workload on the FAA which this program will entail. At this time we have the resources to handle the program as it relates to the commuters. From a broad perspective, there are 258 commuters out of approximately 3,577 Part 135 operators that will be overseen by 712 FAA inspectors as part of their normal duties. The Associate Administrator for Aviation Standards, is carefully watching the field workload and should we need more personnel, he is under instructions to advise me and we will obtain these individuals."

This statement did not respond directly to the question of whether then existing staffing levels were sufficient to handle surveillance of air taxi operators and the myriad of responsibilities of inspectors other than commuter airline surveillance. It is not unreasonable to assume that 712 inspectors could adequately conduct surveillance of 258 commuters. However, the assumption does not appear to be reasonable when this workload is to be added to an already heavy workload.

In fact, a briefing paper prepared by the FAA's Southwest Region Office seems to contradict the Administrator's statement that the FAA has sufficient resources to handle commuter airline surveillance, and interviews with some FAA personnel indicated a widespread concern about their ability to adequately conduct surveillance of commuter operators. The briefing paper stated:

> "The air taxi/commuter expansion has had a direct effect upon the manpower requirements for each GADO. Specifically, the higher standards of the revised FAR 135 for management personnel, training programs, maintenance, and flight checks is demanding additional time for proper certification and surveillance of each operator. Manpower requirements are further extended by Notice 8000.176 that directs 'Increased

surveillance for operators under new Part 135.' To meet these increased demands, there is a need for 36 additional operations and airworthiness inspectors. All 36 of these positions will be assigned only to the air taxi/commuter program. Following the same procedure for inspector assignments to the large air carrier certificates, we plan to assign a Principal Operation's Inspector and a Principal Airworthiness Inspector to the larger air taxi/commuter operators." 5/

The increased surveillance workload also caused field offices to reduce efforts in other critical safety areas. On the impact of increased surveillance, one regional official said that "We've been letting other stuff kind of drift. Its cost us in a lot of other areas." Another FAA regional official stated, "Other programs have to go neglected to some degree." A GADO inspector said that "Our hours are going into commuters. Something else has to give—airport inspections, repair stations, air taxis. . . .We used to do a lot of surveillance of airmen; now we do hardly any surveillance of airmen." Another GADO inspector said that his office has had to reduce surveillance of agricultural operators, repair stations, schools, airmen, hazardous materials, and 215 operators of the 400 corporate jet aircraft under his jurisdiction. "We have to further streamline our work in some priority areas. We're cut to the bone right now on everything that we're doing," another FAA inspector said. Yet another GADO inspector stated, "We really need a principal operations inspector and a principal maintenance inspector on each commuter." Finally, one district office chief said, "I'm doing 55 to 60 percent of the minimum that should be done."

On the regional level, an official said that "surveillance is obviously causing us to leave other things out," and another official said, "FAA took the position that deregulation wouldn't affect manpower, but it has affected our manpower."

The consensus of the FAA employees interviewed was that, even with the increased surveillance program, the resources devoted to commuter airline surveillance fall short of what is required, and that without an increase in manpower, the increased levels cannot be maintained while still accomplishing the normal GADO functions.

At the en banc public hearing, FAA personnel testified that the new surveillance programs were being implemented with existing personnel manning levels. However, the workload required that priorities be rotated among different work units. While the Safety Board realizes that assigning priorities to workload elements is a normal management function, it is concerned that substantial general aviation workload requirements may be getting neglected in order to satisfy the new commuter and air taxi requirements. The Safety Board believes that the FAA should measure the impact of the commuter airline surveillance program on workload in order to assess real manpower needs for continued commuter surveillance once the initial surveillance program prescibed by Notice 8000.176 is completed.

5/ FAA Briefing - Air Taxi and Commuter Operations Southwest Region September 30, 1979.

The Safety Board believes that the FAA surveillance of the commuter industry should not be reduced when the current program of intensive surveillance is scheduled to end. The growth of the commuter market and the importance of the industry to the transportation system dictate that FAA efforts in this area should not wane. Furthermore, the traveling public is entitled to the full measure of safety that is mandated by 14 CFR 135. In order to provide that level of safety, the FAA must continue to consider the commuter airline industry as a separate airline entity, and provide the program, the manpower, and regulatory support necessary to insure proper assistance and surveillance to the industry.

In a June 25, 1980, response to recommendation A-78-38 regarding the manpower levels of GADO offices, the FAA stated that "the FAA has surveyed the regions as to their requirements for additional staffing to ensure the adequacy of the air taxi/commuter program. We are now providing 50 additional positions to the field offices in FY 1980 to support these safety programs, and intend to provide an additional 104 positions in FY 1981. . . ." The Safety Board commends the FAA for these actions to increase the manpower levels in the GADO offices to support the surveillance of Part 135 operators.

During the field survey and public hearing, several other aspects of FAA commuter surveillance were discussed. Many operators believed that larger commuters received proportionally more FAA surveillance and assistance than the smaller commuter airlines. In turn, the large operators were better able to correct regulatory deficiencies and to utilize FAA assistance on maintenance and operational problems. Larger operators also reported that they generally could confer with FAA inspectors whenever necessary.

Some mechanics and pilots observed that FAA inspectors rarely conducted maintenance surveillance after 5 p.m. The bulk of commuter maintenance is done during the night shift. FAA officials stated that some surveillance is conducted at night, but that the frequency of night surveillance is low. The Safety Board believes that the FAA should increase its surveillance of maintenance facilities during periods when commuter maintenance is actually being conducted.

Some pilot representatives stated that FAA operations inspectors infrequently performed surveillance of commuter airlines at stations remote from the FAA GADO. As a result, weight and balance discrepancies, improper dispatching procedures, hazardous materials violations, and poorly trained station personnel were more likely to go undetected at the more remote locations. Pilots stated that aircraft returning to stations located nearer to GADO's generally are operated properly since there was an increased likelihood of an FAA ramp inspection.

Commuter Air Carrier Inspectors.--Recommendation A-72-190, issued in May 1972, urged the FAA to assign inspectors to the principal duty of conducting surveillance of commuter airlines. In order to conduct effective surveillance, FAA inspectors must be specially trained for commuter operations in a manner similar to air carrier inspectors. In addition, since the commuter inspector should concentrate on commuter operations, his responsibility for general aviation activities should be subordinate to his commuter airline activities. The Safety

Board believes that the size, growth potential, level of sophistication, and the safety needs of the commuter industry require an FAA inspector who is specially trained to work with commuter airlines. Concurrently, general aviation activities should be handled by general aviation inspectors who are not burdened with a large commuter airline surveillance workload.

However, within the area of commuter surveillance, providing adequate training programs is complicated by the lack of homogeneity of the industry. A single carrier may operate three types of aircraft or have single-pilot IFR authorization only on certain routes. The many operating requirements of any one company require specific knowledge and training for the inspector.

At the en banc hearing, commuter operators testified that better trained and better qualified FAA inspectors are needed, especially in the airworthiness field. FAA testimony indicated that new training programs and aircraft qualification courses have been established recently, and that inspectors assigned to commuter surveillance are being trained as quickly as possible. The Safety Board believes that the scope and content of the inspector training program must keep pace with the immediate and long-range needs of the commuter industry.

Standardization of Surveillance.—The Safety Board found a lack of standardization between individual inspectors within the same GADO, between GADO's within a Region, and between Regions. Examples of the lack of standardization included differences in interpretations of regulations, administration of flight checks, aircraft operating procedures, and aircraft equipment requirements. The Safety Board has issued four safety recommendations relating to this issue, the first in 1972 and the last in 1979. The FAA's response to the Safety Board's recommendations was embodied in the new surveillance program under Notice 8000.176. The Board will continue to review the FAA surveillance program to determine if the standardization of the surveillance is improved. The Safety Board believes that improvements in this area will allow individual inspectors more time to concentrate on safety issues and will improve the relationship between operators and FAA inspectors.

Communications.—Commuter operators testifying at the public hearing and many of the managers contacted during the field survey stated that there was a lack of a coordinated communications within the FAA. This statement related to policy implementation and timely dissemination of operational, maintenance, and regulatory changes. Examples included operator knowledge of an Airworthiness Directive before the local GADO was notified, the failure of an operator to be notified of an equipment deficiency until 3 days after the inspection requirement was issued, different operational requirements between two neighboring GADO's, and inconsistent interpretations of various maintenance requirements between FAA Regions as well as from Headquarters. Many commuter airline operators stated that the lack-of-communication problem has worsened since July 1979.

In January 1980, the FAA held its First Annual Commuter Air Carrier Safety Symposium to promote better communications within the industry. The FAA has since announced that it plans to conduct a series of regional meetings with commuter airline operators to discuss local problems. While the Safety Board

endorses these recent exchanges, testimony at the en banc public hearing revealed that no schedule had yet been developed for holding the meetings in all the FAA regions. In 1972, a series of regional safety meetings was announced by the National Air Transportation Conferences and endorsed by the FAA. However, the program was short-lived. The growth and the regional interests of the commuter airline industry dictate that such a program should be established. The success of the safety program is contingent upon the candid participation of the commuter industry to identify problems and implement solutions.

14 CFR 135 Air Taxi Operators and Commercial Operators.--The Safety Board believes that the revised 14 CFR 135 provides an improved regulatory program for the commuter industry. The FAA and other elements of the commuter industry have stated that the new Part 135 is "an airline standard" and that it should provide to the maximum feasible extent, a level of safety which is equivalent to 14 CFR 121. The Safety Board believes that while the requirements of the regulations are important, the requirements alone nevertheless will have little significant impact on commuter safety. Part 135 will be effective only when its requirements are made known to the industry; interpreted uniformly by all offices within the FAA, and supported by an FAA enforcement and surveillance program substantially more effective than previous FAA programs. Ultimately, however, the commuter industry's compliance with the new regulation and its commitment to a dynamic safety program will be the real measure of Part 135's effectiveness. The importance of the industry's attitude and commitment to safety is a recurrent theme in the Safety Board's accident investigation experience which has revealed that some accidents resulted either from a deliberate evasion of safety requirements or from a lack of commitment to safety. 6/ As a result, the concerted efforts of FAA and industry are vital in order for new Part 135 to produce genuine safety improvements.

With regard to the new Part 135, there are still areas where the Safety Board believes improvements are necessary. One such area is Flight and Duty Time (14 CFR 135.261). During the Safety Board's field survey and public hearing, most operators indicated that the industry range for duty time was 7 to 10 hours daily and that flight time on a daily basis was from 4 to 6 hours. The monthly total flight time ranged from 70 to 100 hours. Commuter managers testifying at the hearing stated that 85 to 95 hours a month was a realistic workload and that these upper limits had been included in some pilot employment contracts.

On May 1, 1972, the Safety Board issued its first recommendation concerning this subject, and as late as October 17, 1979, the Board issued safety recommendation A-79-81 which urged that the FAA:

6/ "Aircraft Accident Report: Alaska Aeronautical Industries, Inc., DHC-6-200, near Illiama, Alaska, September 6, 1977" (NTSB-AAR-78-5); "Aircraft Accident Report: Antilles Air Boats, Inc., Grumman G21A, St. Thomas, Virgin Islands, September 2, 1978" ((NTSB-AAR-79-9); "Aircraft Accident Report: Air East, Inc. B99A, Johnstown-Cambria County Airport, Johnstown, Pennsylvania, January 6, 1974" (NTSB-AAR-75-3); and "Aircraft Accident Report: Downeast Airlines, Inc., DHC-6-200, Rockland, Maine, May 30, 1979" (NTSB-AAR-80-5).

> "Expedite rulemaking which would make the flight time and duty time limitations, and rest requirements for commuter air carriers the same as those specified for domestic air carrier crewmembers under 14 CFR 121."

On January 15, 1980, the FAA responded to this recommendation and stated:

> "Considerable work has been done on amending the present flight and duty time requirements for both 14 CFR 135 and 14 CFR 121 to provide compatible requirements. The final draft of the Notice of Proposed Rule Making does provide for identical requirements for Parts 135 and 121. The Supplemental Notice of Proposed Rule Making, Notice No. 78-3B, on this subject, should be issued by the end of March 1980." (As of July 22, 1980, this supplemental NPRM had not been issued.)

The Safety Board believes that the expansion of 14 CFR 135 operations, and particularly commuter airline operations, to more closely approximate those of air carriers certificated under 14 CFR 121, should be accompanied by measures to assure comparable flight and duty time limitations. Differences in the types of operational activities usually conducted by a commuter airline pilot also support a need for flight and duty time limitations. Commuter airline flights are usually short, and during a long-duty day, a pilot may make numerous approaches and landings and numerous instrument approaches — often conducted as single-pilot IFR operations. Additionally, the commuter airline pilot is frequently required to perform collateral duties, such as baggage handling and aircraft refueling. These factors can all contribute to pilot fatigue, with a possible resultant deterioration of flying skills and judgment.

The matter of pilot age in Part 135 operations has become increasingly important from the standpoint of aviation safety and protection of the traveling public. In 1959, the FAA adopted 14 CFR 121.383, which restricted the use of pilots in air carrier operations to those under age 60. The air taxi/commuter industry was not included in this regulation, since, unlike today, it was not a significant factor in transportation.

The duty day of the pilot in Part 135 operations may be more arduous than that worked by most pilots in Part 121 operations. Even if the flight time and duty time limitations for Part 135 operations are made the same as for Part 121 operations, the equipment and instrumentation of the aircraft often will be less sophisticated. Moreover, pilots may fly certain aircraft in Part 135 operations without a copilot. Consequently, the Safety Board believes that since the rationale used to establish the age limitation in 14 CFR 121 has, in the FAA's opinion, established an acceptable level of safety for commercial operations, this requirement should be equally and immediately applied to Part 135 operations on an interim basis.

Recently, Congress mandated the National Institutes of Health, in consultation with the Department of Transportation, to further study the aging process with respect to a pilot's ability to safely perform his duties, to determine

the efficacy of medical certification of pilots, and to determine the medical need for an age limitation for pilots. The results of this study may well require the FAA to reevaluate the present age limitation rule in 14 CFR 121.383. The Safety Board believes, however, that the operational environment and operating rules for Part 135 operators are sufficiently different from Part 121 operations to warrant a separate study or expansion of the current study to include the effects of fatigue and stress on pilots engaged in air taxi and commuter airline operations with a view toward establishing the need for a different age limitation in 14 CFR 135.

As a result of these concerns, on May 8, 1980, the Safety Board issued the following recommendations to the FAA:

> Determine through a study of the operating environment and rules of Part 135 operators whether the working conditions of Part 135 pilots are sufficiently different to warrant an age limitation different from that established for Part 121 pilots. (A-80-36)
>
> Amend 14 CFR 135.95 to include as an interim measure, pending completion of an appropriate study, an upper age limit for airmen under this Part which provides a level of safety equivalent to air carrier operations. (A-80-37)

The second area which needs improvement is Pilot-in-Command Qualification (14 CFR 135.243). The Safety Board recommended in 1972 that Part 135 be made more stringent so as to require that a pilot-in-command of a commuter airline aircraft possess an airline transport pilot certificate. On December 1, 1978, that requirement was put into effect. However, the Safety Board believes that 14 CFR 135.243 should be expanded to specify a minimum level of multiengine flight experience before a pilot can serve as pilot-in-command of a multiengine commuter aircraft.

The Safety Board discovered in its investigation of the aircraft accident involving a COMAIR PA-31 in Cincinnati, Ohio, on October 8, 1979, and in its investigation of the crash of a Universal Airways Beech 70 Excalibur in Gulfport, Mississippi, on March 1, 1979, that the respective pilots-in-command had less than 120 and 140 hours of total flight time in reciprocating multiengine aircraft. While the Board commends the FAA for issuing an emergency regulation which requires new time-in-type requirements for pilots-in-command, the Board believes that the regulation should also be amended to preclude relatively inexperienced multiengine pilots from serving as pilot-in-command.

The field survey and testimony at the hearing indicated that many commuter airlines have established minimum multiengine total time requirements between 1,000 hours and 3,000 hours for newly hired pilots-in-command. A few companies set the hiring requirement at 500 hours. Testimony from commuter managers supported the concept of establishing some minimum multiengine flight-hour requirements for pilots-in-command.

Training requirements are the third area which needs improvement (14 CFR 135.321 - Subpart H.) Several Safety Board investigations have revealed lack of pilot training in aircraft which are loaded to their maximum certificated gross weights or with varying center of gravity limits. On October 17, 1979, the Safety Board issued safety recommendation A-79-80 which called for training of pilots in aircraft with different gross weight configurations. The FAA has responded that Part 135 is being amended to require operating experience similar to Part 121 for pilots-in-command of commuter flights. In addition, they stated they would issue a directive by February 1980, to address testing standards under Part 135. While the Safety Board will monitor the FAA's progress in this area, we urge the FAA to place emphasis on the conduct and the content of commuter airline training programs.

The fourth area which needs improvement is Flight Operations (14 CFR 135 - Subpart B). Although there is no requirement under 14 CFR 135 for a certificated dispatcher in commuter flight operations, the Safety Board believes that the proper operational control of commuter flight operations requires the accomplishment of dispatcher functions. Testimony at the public hearing indicated that most companies employed flight followers or flight controllers who performed certain dispatch functions. These uncertificated personnel did weight and balance computations, prepared load manifests, checked weather, and monitored the preflight planning. Many operators stated that their companies sponsored training programs to insure the qualification of these personnel. In addition to the testimony, the Safety Board's field survey verified that most commuter operators employed--and in some cases trained--personnel whose primary duties were dispatch functions.

The Safety Board believes that trained flight operations personnel are necessary to insure proper control of Part 135 flight operations. The duty would not require certificated dispatchers, except as required by 14 CFR 121. This function should be accomplished, where the size and structure of the company permits, by an individual other than the chief pilot or the director of operations. The separation of duties would provide a degree of objectivity, tend to reduce the possibility of undue management pressure on pilots, and increase continuity of operational control. Accordingly, 14 CFR 135 - Subpart B should be amended to require that each commuter airline use trained personnel to accomplish flight operations functions. The Safety Board recognizes that small commuters are not able to employ large flight operations staffs. However, regardless of company size, the individuals performing the flight operations duties should be trained and competent.

The sixth and final area of needed improvement is to require more current empty weight and center of gravity data (14 CFR 135.185). 14 CFR 135.185 requires that the empty weight and center of gravity be calculated from values established by actually weighing the aircraft every 36 months. The Antilles Air Boats accident revealed the problems involved in establishing the empty weight of an aircraft. In addition, testimony by pilot representatives and the Board's accident investigation experience have indicated that the 36-month period should be reduced to a more frequent interval. Weight and balance - center of gravity problems have been recurring factors in commuter accidents, so the recording of

the most accurate data will serve as an important element in the achievement of correct weight and balance conditions. 7/

General Observations.—Commuter managers who were interviewed during the field survey and those who testified at the hearing stated that the FAA GADO inspectors have assumed a "get tough" enforcement attitude toward commuter airline operators. This attitude, according to many managers, is creating a rift between the FAA and the industry and is, in many instances, blocking cooperation and communications within the industry. While the Safety Board supports the strong enforcement of the regulations, the Board believes that assistance by the FAA is also necessary for the promotion of aviation safety, particularly following a major overhaul of regulations, such as the new Part 135.

Commuter Airline Industry

With the adoption of the new Part 135 in December 1978, and the new recertification and surveillance programs of Notice 8000.176, the commuter airline industry was placed on a level with certificated route and local service air carriers for safety accountability. The intent of the new Part 135 with regard to safety comparability was stated in the preamble to the new Part 135.

> "A major goal of this revision of Part 135 is to provide the passenger traveling on an on-demand air taxi flight or commuter air carrier flight with the level of safety comparable to Part 121, considering the differences between these operations, the cost versus benefits and the overall feasibility of implementation." (Emphasis added)

The differences in the requirements for Part 135 and Part 121 operations, as reflected in CAR 42(a) and the original Part 135 issued in 1964, were intentional since it was recognized that the air taxi/commuter industry could not survive economically if it was required to meet Part 121 standards. As a result, the original Part 135 standards for flight operations, maintenance, and training programs were substantially less stringent than Part 121 requirements. The category of aircraft employed by the commuter industry - Part 23 aircraft - did not have the capabilities of those used in Part 121 operations, and many of the airports served by commuter airlines were not as well equipped as airports served by certificated route air carriers. Coupled with the regulatory differences were operational and economic influences on the overall performance of the industry. Operationally, the turnover of pilots, maintenance personnel, and management

7/ "Aircraft Accident Report: Air East, Inc. B99A, Johnstown-Cambria County Airport, Johnstown, Pennsylvania, January 6, 1974" (NTSB-AAR-75-3); "Aircraft Accident Report: Rocky Mountain Airways, Inc., DHC 6-300, Cheyenne, Wyoming, February 27, 1979" (NTSB-AAR-79-10); "Aircraft Accident Report: COMAIR, Inc., Piper PA-31, N6642L, Covington, Kentucky, October 8, 1979" (NTSB-AAR-80-8); Aircraft Accident Report: Puerto Rico International Airlines, Inc., DH-114, Christiansted, St. Croix, U.S. Virgin Islands, July 24, 1979" (NTSB-AAR-80-3); and "Aircraft Accident Report: Universal Airways, Inc., Beech 70, Excalibur Conversion, Gulfport, Mississippi, March 1, 1979" (NTSB-AAR-79-16).

seriously affected the industry for years and remains an industry safety problem in some areas. Turnover deprived the industry of experienced personnel and created a lack of continuity industrywide.

A paramount consideration to the commuter airline operator is the short stages typical of his route system. For example, 87 percent of all commuter routes are less than 250 miles in length, with an average stage length of 111 miles. 8/ By comparison, certificated route and local service air carriers had only 6 percent of their routes with stage lengths of less than 250 miles. Besides the economic problems caused by the short stages, the more frequent takeoffs and landings have a safety impact by increasing the time spent in the more hazardous regimes of flight.

Several developments have taken place in the commuter industry which will serve to improve the conditions which have affected the commuter safety record. The industry has exhibited steady growth and maturation, especially the larger carriers who transport the majority of the total enplanements. The growth, in turn, has reduced the pilot turnover and has contributed to the overall experience level in the industry. Finally, more capable commuter aircraft are being introduced into the market place. These developments, coupled with the ADA, the new Part 135, and FAA surveillance programs, provide the means to improve the commuter safety record.

Commuter Airline Management.—Since management will implement Part 135 and will oversee the operational, maintenance, and training programs of each airline, management's philosophy toward safety and regulatory compliance is of the utmost importance. This premise has been demonstrated in several commuter accidents. 9/ Although 14 CFR 135 requires only a qualified director of operations, a director of maintenance, and a chief pilot, all operators contacted during the field survey recognized that the management structure should be more extensive. Generally, most commuter airlines had three levels of management regardless of the size of the company. The top level was the president or board of directors, and was concerned primarily with public relations, financing, marketing, and general management. The second level consisted of the directors of maintenance and operations who supervised the daily operations of the company. On the third level were the chief pilot, the training pilot, the supervisor of flight operations, and the maintenance foreman.

8/ Commuter Airline Association of America, 1979 Annual Report, "Creating a New Era" (October 1979) p. 18.

9/ "Aircraft Accident Report: Universal Airways, Inc., Beech 70, Excalibur Conversion, Gulfport, Mississippi, March 1, 1979" (NTSB-AAR-79-16); "Aircraft Accident Report: Puerto Rico International Airlines, Inc., DH-114, Christiansted, St. Croix, U.S. Virgin Island, July 24, 1979" (NTSB-AAR-80-3); "Aircraft Accident Report: Alaska Aeronautical Industries, Inc., DHC-6-200, near Illiama, Alaska, September 6, 1977" (NTSB-AAR-78-5); "Aircraft Accident Report: Antilles Air Boats, Inc., Grumman G21A, St. Thomas, Virgin Islands, September 2, 1978" (NTSB-AAR-79-9); "Aircraft Accident Report: Downeast Airlines, Inc. DHC-6-200, Rockland, Maine, May 30, 1979" (NTSB-AAR-80-5); and "Aircraft Accident Report: Air East, Inc., B-99A, Johnstown-Cambria County Airport, Johnstown, Pennsylvania, January 6, 1974" (NTSB-AAR-75-3).

Although the small size of many commuter airlines precludes an extensive management structure in which different individuals monitor each area, it is important to the successful and safe operation of a commuter airline that safety functions not have to compete among themselves or with other functions for managerial attention. The Safety Board's experience has been that when individual managers are required to perform multiple duties there is an increased tendency for the overall performance to become degraded. This situation is potentially the most serious management problem; the Board's field survey indicated that lower level managers often spent 30 to 70 percent of their time as line pilots. If the lower level managers fail to administer efficient operational, maintenance, and training programs, a short-cut philosophy can filter quickly throughout the entire company and have an adverse effect on safety. The tendency to overload managers appears to be confined to the lower levels, since the field survey indicated that nearly 90 percent of upper management devoted at least 80 percent of its time to management duties.

While there is a direct relationship between commuter airline safety and management's philosophy, the relationship between commuter airline safety and the financial and economic well being of an airline is less clear. Extensive testimony offered at the en banc public hearing by commuter managers, FAA inspectors, and financial experts was that there was no relationship between the factors. A company may barely break even financially because the profits are turned back into equipment, salaries, and safety programs. Secondly, the decision to short-cut regulations and procedures is an upper management decision and is as likely to occur in a profitable company as in an unprofitable one. A safety-conscious company can reduce costs in other ways without sacrificing safety.

On the other side of the issue, the field survey revealed that about 65 percent of the commuter managers believe that there is a relationship between safety and financial and economic posture. According to the survey, financial problems could lead to: (1) disregarding procedures and regulations; (2) discouraging pilots from listing maintenance deficiencies which might ground an aircraft; (3) increasing the likelihood of placing extra passengers or cargo on an aircraft that was at the maximum gross weight; (4) reducing the spare parts inventory, which would affect the maintenance program; and (5) reducing the quality of pilot training programs.

Although the subject has not been documented extensively through accident investigations, the Safety Board believes that, there is some correlation between safety and the economic posture of an airline. When a company is losing money, there are naturally pressures on management to reverse the situation. If the effort to economize results in program and manpower reductions, safety can be affected. In a worse case situation, the company could be pressured to disregard procedures or regulations to increase profitability. However, the Board has found that the tendency to lower safety standards to increase profits is rare and does not characterize the commuter industry. The number of commuter airline managers who encourage or tolerate regulatory noncompliance and poor operating practices seem to be few. Those airlines, accept unsafe operating practices for economic gain without evaluating their safety impact. The Safety Board believes that the FAA has the means to bring about management improvements in the companies,

and that company managers, pilots, and employees must demand uncompromised standards of safety within their respective airlines. Since management's philosophy is a subjective topic, it is difficult for government regulators to assess the adequacy of the management of an individual company before the company is certificated, especially if the minimal requirements are satisfied and an acceptable management structure exists. Thus, it is incumbent upon the FAA to emphasize continuing surveillance and on the commuter airline industry to develop sound management structures which meet the expansion needs of individual commuter airlines so as and to maintain a high level of management integrity regarding the safety aspects of operational, training, and maintenance programs.

Commuter Flight Operations.--Flight operations management and the manner in which operational control is exercised by management is probably the single most important influence on commuter flight safety. Within an airline, clear lines of operational control should be evident from a director of operations to the chief pilot, flight operations control personnel, and training personnel. Where the size of the airline requires that managers fill multiple positions, the individual responsibilities of the manager must be defined clearly. The clear lines of authority serve to fix responsibility on particular individuals and to reduce the tendency to overload one manager with several areas of responsibility. Just as assignment of a too heavy workload to an FAA inspector reduces his effectiveness, assignment of the responsibilities of chief pilot, training pilot, and line pilot, for example, to one person can reduce the effective performance of that person in all areas if the workload becomes excessive. More importantly, multiple responsibilities centralize authority in one person and reduce the checks and balances which should exist.

During the field survey, about 40 percent of the operators stated that they employed company-trained personnel to perform flight operations functions, while some of the larger commuters stated that this function was handled by certificated dispatchers. About 50 percent of the operators assigned the flight-planning/flight-following function to key operational management personnel or ticket agents, or station managers. All operators stated that the pilot-in-command was ultimately responsible for proper preflight planning. Testimony at the hearing indicated that every commuter should have trained personnel in flight operations to perform the dispatch functions and to assist the pilot-in-command with preflight activities. The Safety Board realizes that smaller commuters cannot afford to employ large flight operations staffs. However, the Board believes that each commuter airline must incorporate in its flight operations manual operational procedures that assure that: (1) operational control is maintained; (2) dispatch duties of preflight planning, loading, weight and balance procedures, and flight-following are assigned to specific individuals; and (3) clear lines of responsibility are established reflecting the relationship of the pilot-in-command to the persons charged with the dispatch functions.

The Safety Board has been concerned with the high incidence of weight and balance errors implicated in commuter airline accidents. In addition to the industrywide need for improved operational control, commuter airlines must: (1) improve the training of flight operations personnel and the pilots in weight and balance procedures; (2) establish sound weight and balance procedures and; (3) increase the supervision of load manifest and the actual loading of the aircraft.

FAA Notice 8000.183, Weight and Balance Control -Air Taxi Aircraft, issued on October 23, 1979, required that operators use actual passenger weights for aircraft with nine or less passenger seats. The Notice stated: "The use of average passenger, crew, or baggage weights for aircraft of 9-or-less passengers is conducive to exceeding weight and balance limits. Again, the small passenger groups do not lend themselves to weight averaging." This Notice was modified by Notice 8000.189 which exempted turbine-powered aircraft and allowed the use of weight range for passenger weights. However, on May 14, 1980, Advisory Circular AC-120-27A, "Aircraft Weight and Balance Control," was issued. The AC, which is not mandatory, stated: "Actual or average passenger weights may be used to compute passenger loads over any segment of a certificate holder's operation except that actual weights should be used for operations with reciprocating powered aircraft of 9 or less seats, and for all operations involving nonstandard weight passenger groups. Both methods may be used interchangeably provided only one method is used for any flight from originating to terminating point . . . ."

The Safety Board believes that the logic of Notice 8000.183 is correct with respect to the use of actual weights for reciprocating engine aircraft with nine seats or less. The wording of AC-120-27A provides latitude which is too broad to prevent weight and balance deficiencies. The safety hazards which have resulted from weight and balance errors dictate that only actual passenger weights be used for small aircraft, and the FAA recognized the dangers of average weights in Notice 8000.183. Therefore, the Safety Board recommends that the FAA require all Part 135 flights in 9 seats or less reciprocating engine aircraft to use only actual passenger weights for weight and balance computations.

More than 25 percent of the commuter airline accidents between 1975 and 1979 involved inadequate preflight planning or the failure to follow approved procedures. While improved operational control methods will enhance the safety record in these areas, adequate scheduled turnaround time between legs of flights is needed to afford pilots and ground personnel the time to perform the necessary preflight details. Many operators testified that a 10- or 15-minute turnaround time was scheduled, and pilot representatives stated that this period was too brief. Turnaround time must be sufficient to allow for the proper and efficient accomplishment of all required tasks. The determination of adequate times must be made by the company, pilots, and the FAA after the requirements at each airport are evaluated.

The issue of single-pilot IFR operations was raised by several operators and by witnesses at the hearing. While 70 percent of the operators interviewed in the field survey stated that their companies had authorization to conduct single-pilot IFR flights, many commented that the practice was marginally safe in many areas. The primary objection was that in high-density ATC areas, the pilot can quickly become overburdened. Compounding the situation were long duty days, tedious airport environments, and the extensive flight planning, loading, and other duties required of a commuter pilot. Finally, witnesses pointed out that if the pilot-in-command was incapacitated, there would be no backup in the cockpit.

The Safety Board realizes that the alternative to a single-pilot IFR operation is to require two pilots on all commuter flights. This requirement would cause a

severe economic hardship on many small commuter airlines. However, safety hazards involved in single-pilot IFR operations are compounded by the overall effects of pilot workloads, flight and duty times, and airport environments and should be evaluated before granting single-pilot IFR approval. Further, the evaluation criteria should be standardized throughout all FAA regions.

Commuter Airline Training Programs.—Each commuter airline is required to develop a training manual and a training program and appoints training pilots before the company receives an operating certificate. In addition, the FAA approves the training programs to insure that all the requirements of 14 CFR 135 are satisfied. As a result, each commuter airline has an approved pilot training program, and the Safety Board's field survey verified this finding. However, several recent commuter accidents have revealed that proper training of pilots had not been conducted by individual airlines, notwithstanding the provisions of the training manuals, records, and programs. 10/

The field survey and testimony at the public hearing indicated that pilot training programs varied in scope according to the size of the company. While the largest commuters conducted training programs which exceeded the minimum requirements of 14 CFR 135, most of the smaller companies conducted adequate programs which satisfied the regulations. There were some which maintained a pilot training program only on paper.

In addition to the requirements of the individual training programs, the personnel and facilities that are devoted to training programs vary greatly according to the size of the airline. A manager of a large commuter stated that his company employed a full-time director of training, four flight instructors/check airmen, and two full-time ground instructors. In addition, instructor pilots are not allowed to administer final check rides to their student pilots. At the other end of the spectrum were many small airlines where the pilot training function was an additional duty under the chief pilot, and the entire program was administered by line pilots.

The Safety Board recognizes the reasons for the range of training programs and believes that the proper development and administration of a program, not its size, must be emphasized within the industry. The Board's accident investigation experience has revealed many cases in which the company pilot training program was not administered adequately, and as a result, pilots did not receive the training required by the program or the training reflected in individual pilot training records.

10/ "Aircraft Accident Report: Columbia Pacific Airlines, Beech 99, Richland, Washington, February 10, 1978" (NTSB-AAR-78-15); "Aircraft Accident Report: Downeast Airlines, Inc., DHC-6-200, Rockland, Maine, May 30, 1979" (NTSB-AAR-80-5); "Aircraft Accident Report: COMAIR, Inc., Piper PA-31, N6642L, Covington, Kentucky, October 6, 1979" (NTSB-AAR-80-8); "Aircraft Accident Report: Universal Airways, Inc., Beech 70, Excalibur Conversion, Gulfport, Mississippi, March 1, 1979" (NTSB-AAR-79-16); and "Aircraft Accident Report: Alaska Aeronautical Industries, Inc., DHC-6-200, near Illiama, Alaska, September 6, 1977" (NTSB-AAR-78-5).

While a flight operations program or a maintenance program has definable criteria by which the programs can be evaluated only on a daily basis, the pilot training program generally can be evaluated only by inspecting records, by occasional classroom visits, or by FAA-administered check rides. The Board's field survey indicated that there was infrequent surveillance of commuter airline training, and that virtually all aircraft training was conducted by company training pilots. As a result, the quality of commuter airline pilot training is contingent totally on the integrity and philosophy of company management. Commuter management, regardless of the size of the company, must insure that the training requirements of 14 CFR 135 are satisfied, and that the program will provide the high quality training that is required to prepare pilots to cope with predictable emergency situations.

Although the lack of FAA surveillance of training is being addressed by the FAA under the current surveillance program, there remain several other pressures which detract from a company's training program:

(a) Lack of aircraft which can be spared from revenue operations.
(b) Cost of training.
(c) Lack of a training department and classroom facilities in smaller commuter airlines where the training personnel have other company duties.
(d) Fluctuating pilot requirements result in hiring and training on an expedited basis.
(e) Turnover of pilots is higher than for certificated route air carriers, which results in proportionally higher training expense and training personnel requirements.
(f) Lack of simulators.

Although 14 CFR 135 generally contains adequate minimum standards for commuter airline pilot training, there are some areas where additional improvements are warranted.

On October 17, 1979, the Safety Board recommended that the FAA require pilots flying under 14 CFR 135 to be trained thoroughly on the performance capabilities and handling characteristics of aircraft when an aircraft is operated at the maximum certificated gross weight and at the limits of the center of gravity envelope. The Safety Board's field survey and accident investigation experience have indicated that most flight training is conducted near minimum gross weights. This condition does not reflect the aircraft characteristics normally experienced in revenue operations. The Board also believes that initial and recurrent flight training programs should stress increased flight training on emergency procedures, especially at higher gross weights. Finally, the Safety Board believes that the accuracy of commuter airlines' training records must be improved to reflect correctly the actual training that a company has admininstered to each individual. While accurate recordkeeping will not increase the quality of training, it will serve to facilitate a determination that a curriculum is maintained and that the training is conducted properly.

The Safety Board has endorsed the utilization of flight simulators and procedural trainers for air carrier pilot training and believes that commuter airline

pilot training would benefit greatly from increased use of flight simulation. While the number of suitable simulators is limited, they are generally available at aircraft manufacturers' training locations. The Board believes that training at manufacturers' training facilities will provide the most up-to-date simulator flight training. The Board urges the FAA and the commuter industry to encourage the development of sufficient numbers and types of aircraft flight simulators needed to upgrade the quality and scope of commuter airline training.

Within the area of training, the subjects of maintenance training and dispatcher training were identified as particularly in need of emphasis by those operators contacted during the field survey and by the commuter managers who testified at the hearing. The development of more sophisticated commuter aircraft has made on-the-job training for mechanics not feasible. Most maintenance managers recommended that all newly hired mechanics be sent to manufacturers' maintenance schools for initial and updating training. Regular company-sponsored, recurrent maintenance training for mechanics should also be provided conducted by all commuter airlines. Also, company-operated dispatcher training should be administered to those employees serving in the flight operations sections to insure that preflight planning, weight and balance procedures, and flight-following programs are properly conducted.

Commuter Airline Maintenance Programs.—Commuter airline maintenance programs, like pilot training programs, must be developed and accepted by the FAA before a commuter airline begins operation. The effectiveness and safety consciousness of a maintenance program, therefore, is contingent totally on the quality of the management effort and the commitment of the company to sound maintenance practices.

Although a proper management structure may exist, accidents can still be caused by poor maintenance practices if management's philosophy is to short-cut good maintenance procedures, or if the management structure exists on paper but is not effective in practice. Obviously, a good maintenance program cannot be insured solely by FAA acceptance of maintenance procedures and workforce structure; a company commitment to sound practices, coupled with FAA surveillance, must be present.

The field survey indicated that those large and medium size carriers surveyed had a maintenance management structure composed of a director of maintenance and supervisory mechanics for each work shift. The workload was programmed and checked by supervisors and supported by a program of "by-the-book" maintenance procedures. Large carriers generally provided manufacturer and company training for the mechanics. Every FAA official and commuter manager who testified at the hearing stated that without a combination of good management structure, sound procedures, and adequate workforce, maintenance programs will become ineffective and unsafe.

Major maintenance problems brought out in testimony at the hearing and in the field survey generally are supported by the Board's accident investigation experience. These problems are, in part:

1. Poor quality of maintenance management.
2. Shortages in the availability of airframe and powerplant mechanics to the commuter industry.
3. High turnover rate of mechanics.
4. Lack of company training for mechanics.
5. Poor recordkeeping.
6. Undue management pressure on the individual mechanics to shortcut procedures.
7. Failure to follow established maintenance procedures for various reasons--training, management pressures, and operational pressures.
8. Lack of effective FAA surveillance.

FAA personnel and commuter managers stated that an FAA maintenance inspector is able to judge the quality and integrity of a maintenance program during the course of general surveillance. Indicators of the status of the maintenance program are: (1) spare parts availability; (2) actual maintenance procedures compared to procedures in the maintenance manual; (3) the number of flight delays for maintenance; (4) frequent "on-the-floor" observation of the maintenance program followed by ramp inspections of the aircraft; (5) quality of records; and (6) conversations with mechanics and pilots. Nevertheless, the Safety Board believes that recurrent, unscheduled visits by FAA inspectors during peak periods of maintenance activity is an essential element of effective surveillance of maintenance practices.

Commuter Airport System

In 1979 commuter airlines served about 604 airports in passenger service, whereas certificated route air carriers served about 344 airports. A comparison of the airport facilities and navigational aids shows that the airports served by certificated route air carriers have a significantly higher percentage of control towers, precision instrument approaches, and terminal radar service. (See Table 3.)

The development of airport facilities and air traffic control facilities at airports served exclusively by commuter airlines has lagged noticeably behind that at airports served by certificated route air carriers. There is no difference between the passengers or cargo carried by commuter airlines and the certificated route air carriers; thus, there should not be such considerable variances in facilities as are reflected in Table 3. The Board recognizes that the current disparity is due, in part, to the rapid expansion of the commuter market to new airports. However, the FAA and State aviation organizations must initiate programs to upgrade commuter airports to provide improved levels of facilities and navigational aids. The commuter airports need to be upgraded, and the ADAP program provides one means to accomplish this end. The ADAP program should be amended to provide a larger share of the revenues to the expansion and upgrading of commuter airports and to developing new feeder airports for commuter airlines operations. The Safety Board believes that the airport facilities and instrument approach facilities at commuter served airports must be upgraded to provide improved levels of safety, reliability, and growth. In addition, the safety and efficiency of the new generation of 30 to 60 passenger commuter aircraft are predicated upon airports which are considerably better equipped than the existing group of commuter airports.

Table 3.—Comparison of Airport Facilities and Navigational Aids.
(Does not include Alaska or Hawaii)

	Exclusively Commuter	Exclusively Air Carrier	Jointly
Total airports served	362	102	242
	No. %	No. %	No. %
With a control tower	82 - 23	47 - 46	200 - 83
With 14 CFR 139 certification	148 - 41	102 - 100	242 - 100
With terminal radar service	45 - 12	35 - 34	139 - 57
With a precision approach	121 - 33	68 - 67	219 - 90
With a nonprecision approach	185 - 51	34 - 33	23 - 10
With no published approach procedure	56 - 16	0	0

Commuter Airline Aircraft

The commuter airline fleet consisted of about 1,325 aircraft in 1979, and it is estimated that the fleet will reach 1,500 aircraft by the end of 1980. Nearly 80 percent of the commuter fleet consists of multiengine aircraft, with that percentage increasing each year.

Currently, about 70 percent of the commuter airline fleet is certificated under 14 CFR 23, Airworthiness Standards: Normal, Utility and Acrobatic Category Airplanes. The remainder are certificated under 14 CFR 25, Airworthiness Standards: Transport Category Airplanes. All aircraft operated in Part 121 operations must meet 14 CFR 25 requirements. Part 25 performance standards are significantly more demanding than Part 23, and Part 25 systems requirements are more extensive and provide a greater degree of redundancy.

Part 23 has historically been the general aviation airworthiness regulation for aircraft which weigh less than 12,500 lbs. It provides a level of airworthiness safety which is adequate for small aircraft operations, but is considerably below transport category standards in some areas. The most noteworthy shortcoming of

Part 23 aircraft is the single-engine climb performance requirements for multiengine aircraft. Although Part 23 has single-engine climb requirements for multiengine aircraft used in commuter operations, the regulation can be satisfied by low single-engine rates of climb (see Table 4). Furthermore, the single-engine rates of climb in Table 4 were determined under the optimal conditions for each series of aircraft, and those conditions are not present in most commuter operations. Finally, the data in Table 4 were compiled by test pilots who were capable of flying the aircraft at maximum efficiency and performance.

The limited single-engine climb performance characteristics of many Part 23, and especially nonturboprop Part 23 aircraft, compound the problems caused by flight operations errors such as weight and balance or center of gravity miscalculations. Pilot error situations which result from inadequate training or inexperienced flightcrews may deteriorate further when a pilot must contend with a limited climb performance in addition to an in-flight emergency. Consequently, while Part 23 aircraft are generally satisfactory for commuter operations, their limitations must be recognized. Each airline must assure that the pilot training programs, and the training to flight operations personnel provide the experience, procedures, training, and individual awareness to overcome the performance limitations which may be encountered in certain emergency situations in Part 23 aircraft. As new generations of commuter aircraft are introduced, the importance of strict operating and training programs will become particularly important to the safe operation of Part 23 aircraft. The Safety Board believes, however, that proper operational and maintenance programs can insure that Part 23 aircraft will continue to provide safe, reliable commuter transportation.

As the need for large commuter aircraft has developed, and especially since the CAB authorized commuter airlines to operate aircraft with a seating capacity of 60 passengers, the requirement for a new certification standard for light transport aircraft has become critical. Clearly, Part 23 is not adequate for the larger aircraft which the industry requires. Part 25, on the other hand, is not conducive in encouraging the design and production of a new generation of commuter aircraft. Consequently, in September 1978, the FAA proposed the adoption of a new standard for light transport category airplanes (14 CFR 24, Airworthiness Standards: Multiengine Light Transport Category Airplanes). Part 24 is designed to maintain the level of safety that is appropriate for light transport aircraft which engage in passenger operations by balancing the transport category requirements of Part 25 with the small aircraft requirements of Part 23.

The Safety Board believes that the commitment of the FAA and the industry to a new generation of commuter aircraft which will incorporate increased safety standards should have a positive effect on the safety record and growth of the commuter industry. The Safety Board urges the FAA to expedite the evaluation of Part 24's performance, reliability, and equipment requirements for the light transport multiengine aircraft compared to the same requirements provided by Part 25. Prompt settlement on the final standard for the future generation of commuter aircraft will allow manufacturers, to provide more capable, new equipment on commuter routes as soon as possible.

Table 4.--Single Rate of Climb for Light-Twin Make and Model (In Order of Accident Rate).

AIRCRAFT	ENGINE-FAILURE ACCIDENT RATE (PER 100,000 HRS)	RATE OF CLIMB (FEET/MINUTE)	AVERAGE RATE OF CLIMB (FEET/MINUTE)
Beech 60	-	307-319	313
DeHavilland DHC-6	-	340	340
Swearingen SA26T, 226TC	-	520-700	610
Beech 99, 100	0.39	335-452	394
Aero Commander 680T, 681, 690	0.40	510-893	702
Beech 65-90	0.41	470-555	513
Piper PA-31	0.74	230-660	445
Cessna 401, 411	0.81	255-270	263
Beech 95-55, 56, 58	0.82	204-410	307
Piper PA-23-235, 23-250	0.93	220-240	230
Cessna 421	1.06	300	300
Piper PA-34	1.18	225-230	228
Mitsubishi	1.46	450-920	685
Cessna 310	1.74	330-440	385
Cessna 320, 340	1.78	250-500	375
Beech 65	1.95	180	180
Piper PA-30, 39	1.98	225-260	243
Beech 50	2.04	195-300	248
Cessna 337	2.39	325-450	388
Beech 18	2.76	260-340	300
Beech 95	2.87	205	205
Aero Commander 560F, 680E, 680F, FL, 700, 720	3.43	293-490	392
Aero Commander 500, 520, 560	3.46	266	266
Piper PA-23, -150, -160, -180	6.91	240	240

Source: National Transportation Safety Board Special Study (NTSB-AAS-79-2) Light Twin-Engine Aircraft Accidents Following Engine Failures, 1972-1976; December 13, 1979.

Flight Recorders and Crashworthiness

The Safety Board has placed a high priority on two programs for general aviation aircraft which are directly related to improving commuter airline safety--the installation of flight recorders, and the identification and solution of crashworthiness problems.

On April 13, 1978, the Safety Board issued Safety Recommendations A-78-27 through -29. These recommendations called for the developmnent of low cost flight recorders (cockpit voice recorders (CVR) and flight data recorders (FDR) for use on complex general aviation aircraft. The recommendations also advocated an interim measure to prohibit the operation of turbine-powered aircraft certificated to carry six passengers or more, which require two pilots by their certificate, without an operable CVR capable of retaining at least 10 minutes of intracockpit conversation when power is interrupted.

In response to the recommendations, the FAA stated on June 30, 1978, that an Advanced Notice of Proposed Rule Making would be issued to identify appropriate recorder standards and specifications. However, no final rulemaking has occurred, and the FAA's response to A-78-27 and 28 is considered unacceptable.

The FAA response to recommendation A-78-29 was considered unacceptable when the FAA determined that it would require CVR's on turbojet aircraft certificated for 10 passengers or more rather than on turbine-powered aircraft certificated for 6 passenger or more.

With the continued growth in the numbers of complex multiengine aircraft in general aviation, particularly in commuter and air taxi operations, the Safety Board believes that recorders are urgently needed. In fact, the Board believes that these recorders are as justified as those required to be installed in the air carrier fleet since 1959. At that time, high speed, increased reliance on avionic equipment, and lack of eye witnesses combined to limit the investigative evidence and often eliminated the possibility of determining causation. These same factors are hindering today's investigations of accidents involving complex multiengine aircraft in commuter airlines and corporate operations.

Accident investigation experience with air carrier aircraft has proven that CVR's and FDR's have been invaluable tools in identifying aircraft design deficiencies, common operational problems, shortcomings in the air traffic control system, and the effects of meteorological phenomena on aircraft performance. In almost every accident investigation involving these aircraft during the past 10 years, one or both of these recorders provided investigators with the clues necessary to piece together the circumstances of the accident. To its credit, the aviation community has always responded to these accident findings by instituting immediate remedial actions, or at the very least, by researching identified problem areas. The result has been continued improvement in aviation safety.

The Safety Board has had long-standing concerns about the crashworthiness of general aviation aircraft which make up a majority of the commuter airline

fleet. The Safety Board has made many recommendations related, in part, to aircraft seats, restraint systems, the flammability of aircraft interiors, and aircraft cabin safety, and for FY 1979, the Safety Board adopted the following safety objective:

> "Identify and document general aviation crashworthiness and crash injury prevention problems and propose corrective actions, with emphasis on achieving specific improvements in occupant restraint systems."

As a result of the Board's efforts in the area of crashworthiness, the Board achieved a reversal of the FAA position opposing any change in its 1977 rule requiring installation of shoulder harnesses on only front cockpit seats and only on new general aviation aircraft. This fulfilled the FY 1979 objective of obtaining improvements in general aviation occupant restraint systems. As a result of a February 1, 1979, meeting between the Chairman of the Board and the FAA Administrator, the Administrator wrote to the Board on February 15, 1979, indicating that he had ordered the reevaluation of the 1977 FAA rule requiring the installation of shoulder harnesses on the front seats of new general aviation aircraft to determine whether the requirement should be broadened to include all seat locations and extended to cover older aircraft. This was the position consistently advocated by the Board in its safety recommendations based on the Board's conviction that general aviation crash survivability can be significantly increased if these safety improvements are made. However, the Board notes that this is only one of many areas related to general aviation aircraft crashworthiness where much safety improvement is needed.

Alaskan Operations

The Safety Board interviewed three Alaskan commuter airline operators during the field survey and received testimony from Alaskan commuter operators managers during the en banc public hearing. In addition, the Board has investigated numerous commuter accidents in Alaska in recent years.

Because of the severe environmental conditions, commuter airlines in Alaska face significantly more operational, maintenance, and training problems than operators in other States. As a result, Alaskan operators have unique needs and safety problems. For example, one Alaskan operator testified: "Currently we operate as a scheduled subservice to Wien Air Alaska from three major bush hub stations in Alaska--Bethel, Nome and Kotzebue. Out of these hubs, we move passengers and mail into and out of 41 bush communities on a scheduled basis. To clarify this it should be noted that the mail going out to the bush stations consists of everything that is necesssary to survive at each community, to include nearly all consumer products, food, clothing, and diapers, must be air mailed to each village. There are no roads in western Alaska. These communities are totally dependent upon air service for their support. Due to the relatively small size of some villages, we are providing what the CAB terms "essential service." Our route structure is over 7,500 N.M. and we average over 100,000 N.M. a month. Weather conditions vary from summer 24 hour daylight, 80° F plus temperatures to winter 20-24 hour darkness and temperatures of below -50° F. Other than at the hub

airports, there are no terminal or enroute navigation aids available, making this a VFR operation only. Of the 41 villages covered, only four have operational runway lights, and no Visual Approach Indicators (VASI's). Maintaining a schedule in these conditions is at best a challenge and at times impossible." However, significant safety issues are present in Alaska which require the attention and assistance of the FAA and the commuter industry.

(1) Increased en route navigational aids and instrument approach facilities.
(2) Improved airport facilities, especially runway edge lights, visual approach slope indicators, and runway end identifier lights.
(3) Improved weather reporting facilities.
(4) Increased radar coverage.
(5) Increased numbers of FAA inspectors.

The Safety Board believes that the needs of the commuter airline and air taxi industry in Alaska require immediate attention of the FAA as well as the State of Alaska. As a result, in April 1980, the Safety Board began a special study to determine which factors most seriously effect the safety commuter airline and air taxi operations, and what measures are required to reduce their adverse effect on the safety of Alaskan air transportation.

CONCLUSIONS

1. The commuter airline industry grew rapidly in the 1970's, and is a vital portion of the air transportation industry.

2. The growth of the commuter airline industry has not been paralleled by an adequate growth of FAA regulatory and surveillance programs, or airport, development and aircraft airworthiness standards.

3. The commuter airline industry accident rate is higher than the accident rate of that of U.S. certificated route air carriers.

4. The 6-year period expended by the FAA to revise 14 CFR 135 was excessive and delayed the development of measures with the potential to enhance commuter airline safety.

5. The CAB views its role as primarily concerned with the economic regulation of commuter airline operators, and, for the most part, relies on the FAA for safety determinations.

6. The safety deficiencies cited in the 1972 Air Taxi Study continued as major safety deficiencies throughout the later 1970's.

7. The FAA's commuter safety activities were handled as an element of their general aviation safety program.

8. Safety Board accident investigations have uncovered repeatedly instances of inadequate FAA surveillance.

9. FAA inspectors assigned to conduct commuter airline surveillance are primarily general aviation-oriented and trained.

10. Sufficient indicators existed before 1979 which should have caused the FAA to strengthen commuter surveillance programs.

11. The FAA has been slow to recognize that FAA inspector workloads and GADO staffing levels do not allow adequate surveillance of the commuter industry.

12. FAA GADO inspectors often have such a heavy general aviation workload that they have been unable to devote adequate man-hours to commuter airline surveillance.

13. FAA GADO workloads are such that attempts to increase commuter surveillance result in a shift of attention away from other duties.

14. Larger commuters and commuter airlines in major population areas receive proportionally more surveillance and assistance than smaller commuters or commuters located in remote areas.

15. Recent FAA surveillance programs requiring inspectors to devote more time to commuter airlines with only minor staffing adjustments appear to reflect a management decision to downgrade general aviation duties.

16. FAA surveillance of commuter airlines is not standardized from inspector to inspector, office to office, commuter to commuter, or region to region.

17. Training of FAA inspectors assigned to conduct commuter airline surveillance is not sufficient to provide the qualification required to deal with the sophistication and diverse nature of the industry.

18. Surveillance of commuter airline maintenance activities has not been performed frequently enough during evening shifts when the bulk of the maintenance is performed.

19. Commuter airline safety is contingent upon FAA-industry programs and safety attitudes, and on uniform, aggressive equitable implementation of the new 14 CFR 135.

20. The current flight and duty time requirements of 14 CFR 135 are unsatisfactory since they allow commuter pilots to be on duty for an excessive number of hours for consecutive days.

21. The current pilot-in-command qualifications standards should be revised to include minimum multiengine flying time requirements for pilots of multiengine commuter airline aircraft.

22. Commuter airline training programs for pilots, mechanics, and ground personnel vary in scope and quality according to management emphasis and philosophy, and according to airline size.

23. Effective operational management is the basis of sound operational control.

24. Commuter airlines should establish functional lines of operational control and responsibility to the lowest level of company management.

25. A common management fault among some commuter airline operators is to overload middle- and lower-level operational managers with too many job functions.

26. Operational control should include trained flight operations personnel.

27. Preflight planning deficiencies, especially weight and balance deficiencies, derogate the safety of commuter airline operations.

28. Inadequate turnaround times or inadequate procedures to govern turnarounds, or both, can create unsafe commuter flights.

29. Managers of training programs should have a minimum of other major operational management functions.

30. FAA surveillance of pilot training programs has not insured high quality training.

31. Many economic and operational pressures exist which detract from training programs.

32. Most pilot training programs do not include flight training at high gross weights or sufficient flight training on emergency procedures.

33. The accuracy of pilot training records must be improved industrywide.

34. Many small and medium size commuters do not have initial and recurrent training for maintenance personnel.

35. Flight operations personnel should receive formal company training for preflight planning and dispatch-related functions.

36. Effective management and adherence to established procedures are the basis for a sound maintenance program.

37. The limited availability of qualified mechanics and the high turnover of mechanics are major problems for the commuter airline industry.

38. Approved maintenance procedures must be followed without deviation to insure continuity of quality maintenance.

39. FAA inspectors should be able to judge the quality of maintenance programs if sufficient surveillance time is spent with the airline.

40. Airports served exclusively by commuter airlines are significantly less equipped with approach facilities and with runway and approach lights than airports served by certificated route air carriers.

41. Airports served by commuter airlines should be equally considered for precision approach facilities with airports served by certificated route air carriers.

42. The ADAP program has not provided adequate assistance to commuter-served airports.

43. Upgraded airworthiness certification standards will open the way to the design and production of aircraft tailored to commuter airline operations and will, therefore, increase commuter airline safety.

44. Since the management needs of commuters vary, the minimum management personnel requirements of 14 CFR 135 will not necessarily assure adequate management structure in all cases.

45. The effectiveness and safety consciousness of commuter airline management are internal functions of the company and cannot be regulated by the FAA.

46. Management deficiencies are most likely to appear in new or rapidly expanding companies.

RECOMMENDATIONS

Based on the findings of this study, the Safety Board reiterates the following safety recommendations which were previously issued to the Federal Aviation Administration:

> Require that pilots involved in 14 CFR 135 operations be thoroughly trained on the performance capabilities and handling qualities of aircraft when loaded to their maximum certificated gross weight or to the limits of their c.g. envelope, or both. (Class II, Priority Action) (A-79-80)
>
> Expedite rulemaking which would make the flight time and duty time limitations, and rest requirements for commuter air carriers the same as those specified for domestic air crewmembers under 14 CFR 121. (Class II, Priority Action) (A-79-81)
>
> Develop, in cooperation with industry, flight recorder standards (FDR/CVR) for complex aircraft which are predicated upon intended aircraft usage. (Class II, Priority Action) (A-78-27)

Draft specifications and fund research and development for a low cost FDR, CVR, and composite recorder which can be used on complex general aviation aircraft. Establish guidelines for these recorders, such as maximum cost, compatible with the cost of the airplane on which they will be installed and with the use for which the airplane is intended. (Class II, Priority Action) (A-78-28)

In the interim, amend 14 CFR to require that no operation (except for maintenance ferry flights) may be conducted with turbine-powered aircraft certificated to carry six passengers or more, which require two pilots by their certificate, without an operable CVR capable of retaining at least 10 minutes of intracockpit conversation when power is interrupted. Such requirements can be met with available equipment to facilitate rapid implementation of this requirement. (Class II, Priority Action) (A-78-29)

In addition, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Establish a separate classification of commuter airline inspectors to conduct commuter airline surveillance. (Class III, Longer Term Action) (A-80-64)

Provide specialized training for inspectors assigned to commuter airlines to insure that inspectors are qualified in the equipment operated and are knowledgeable regarding commuter airline operations. (Class II, Priority Action) (A-80-65)

Allocate GADO resources to insure that all commuter surveillance and general aviation requirements can be accomplished. (Class II, Priority Action) (A-80-66)

Establish a procedure for distributing surveillance of commuter airline maintenance evenly during all periods when maintenance is performed. (Class II, Priority Action) (A-80-67)

Require that only actual passenger weights be used in weight and balance computations for reciprocative engine aircraft used in Part 135 flights which are certificated for nine or less passengers. (Class II, Priority Action) (A-80-68)

Amend 14 CFR 135.243 to require a minimum number of multiengine flight hours for a pilot-in-command of a multiengine commuter airline flight. (Class II, Priority Action) (A-80-69)

Amend 14 CFR 135 Subpart B to require that dispatch and flight operations duties are supervised by personnel trained in those functions. (Class II, Priority Action) (A-80-70)

Amend 14 CFR 135.185 to require that aircraft empty weight and center of gravity be determined more frequently. (Class III, Longer Term Action) (A-80-71)

Evaluate and revise as appropriate the criteria for the authorization of single-pilot IFR operations for commuter airlines. Class III, Longer Term Action) (A-80-72)

Expand the ADAP program to support the development of commuter served airports. (Class II, Priority Action) (A-80-73)

Revise the qualifying criteria to insure that a larger percentage of commuter served airports are equipped with instrument landing systems. (Class II, Priority Action) (A-80-74)

Insure, to the extent possible, that airports which are served by commuter airlines are equipped with an instrument approach facility. (Class II, Priority Action) (A-80-75)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ PATRICIA A. GOLDMAN
Member

/s/ G.H. PATRICK BURSLEY
Member

ELWOOD T. DRIVER, Vice Chairman, did not participate.

July 22, 1980

APPENDIXES

APPENDIX A

SAFETY RECOMMENDATIONS FROM 1972 AIR TAXI STUDY

Recommendations

On the basis of the findings discussed in this report, the National Transportation Safety Board recommends that:

The Federal Aviation Administration:

1. Expedite redrafting of FAR 135 in its entirety, recognizing that commuter air carrier operators are separate entities from the smaller air taxi charter operators. (Recommendation A-72-171)

2. Establish and maintain a separate listing of all current holders of air taxi operator certificates to permit the identification of each operator by type service being performed. (Recommendation A-72-171).

3. Expedite proposed programs to assure the financial ability of each commuter air carrier and air taxi operator holding interline agreements to conduct safe operations. (Recommendation A-72-173).

4. Amend FAR 135 to include qualification requirements applicable to the Director of Operations, Chief Pilot, Director of Maintenance, and Chief Inspector in all commuter air carrier operations. (Recommendation A-72-174).

5. Amend FAR 135 to provide that a qualified individual be delegated by each commuter air carrier to act in the capacity of safety officer and to monitor all safety aspects of the overall flight and maintenance operations. (Recommendation A-72-175).

6. Amend FAR 135 to require that the pilot-in-command in air taxi commuter air carrier operations hold a current Air Transport Pilot rating. (Recommendation A-72-176).

7. Amend FAR 135.127 to prohibit the use of part-time or nonpaid second-in-command pilots in commuter air carrier operations. (Recommendation A-72-177).

8. Amend FAR 135.136 to provide for daily, weekly, and monthly flight and duty time limitations. (Recommendation A-72-178).

9. Amend FAR 135.136 to provide that all flying, including private as well as commercial, shall not exceed the prescribed flight and duty time set forth in this section. (Recommendation A-72-179).

10. Amend FAR 135.75 and 135.99 to clarify the operating conditions and limitations for Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) over-the-top carrying passengers. (Recommendation A-72-180).

11. Amend FAR 135.143 to include a minimum equipment list to include procedures for continuing flight with inoperative equipment beyond terminal point. (Recommendation A-72-181).

12. Amend FAR 135.33 to include provisions for training and recurrent training for maintenance personnel and to ensure each person who determines the adequacy of work is fully informed about procedures and techniques. (Recommendation A-72-182).

13. Amend FAR 135 to include a new section to ensure that each person who takes action in the case of a reported or observed malfunction of an airframe, engine, propeller, or appliance shall make, or have made a record of that action in the aircraft maintenance log. (Recommendation A-72-183).

14. Amend FAR 135.119 to ensure that the pilot-in-command shall enter or have entered in the maintenance log of the airplane each mechanical irregularity that comes to his attention during flight. Before each flight, he shall ascertain the status of each irregularity entered in the log at the end of the preceding flight. (Recommendation A-72-184).

15. Amend FAR 135.60 to ensure that each certificate holder shall have an aircraft inspection program acceptable to the Administrator. The certificate holders manual must contain the program required by (a) of this section. (Recommendation A-72-185).

16. Established a standard program of utilizing manufacturers recommended overhaul and inspection times on aircraft components, and powerplants and propellers. (Recommendation A-72-186).

17. Monitor all manufacturers' maintenance manuals and encourage operators to utilize the information contained therein as it applies to the individual operator. (Recommendation A-72-187).

18. Standardize procedures for the compilation and dissemination of maintenance discrepancy information to all air taxi/commuter operations. (Recommendation A-72-188).

19. Standardize air taxi surveillance procedures and provide specialized commuter airline training to appropriate principal inspectors of General Aviation District Offices. (Recommendation A-72-189).

20. Assign a principal inspector, or inspectors, to commuter airlines, with primary duties of surveillance of the commuter, and secondary duties with the other segments of aviation. It is further recommended that General Aviation District Offices accelerate efforts to assure that FAR 135 certificate holders maintain training programs. Recommendation A-72-190).

The Civil Aeronautics Board:

1. Require all air taxi operators registered with the CAB, and designated as commuter air carrier, to report the hours flown, the miles flown, and the number of departures in scheduled revenue operations. (Recommendation A-72-191).

2. Require all air taxi operators so classified under Part 298 of the Federal Aviation Act of 1958, to report the number of passengers carried, the hours flown and miles flown, and the number of departures in revenue operations. (Recommendation A-72-192).

3. In proceedings involving the suspension of service by a certificated carrier and the substitution of service by an air taxi commuter operator, request of the FAA a written safety evaluation of such operator: make a specific finding as to the operator's safety fitness; and place the FAA evaluation in the public docket of such proceeding. The safety evaluation by the FAA should include all accident data concerning such operator available in the files of the NTSB. (Recommendation A-72-193).

APPENDIX B

EN BANC PUBLIC HEARING WITNESS LIST

1. Mr. William R. Hendricks, Chief, Aviation Accident, National Transportation Safety Board

2. Public Perspective of Commuter Airline Panel
   - Mr. A. Clark Cannon
   - Ms. Barbara Goldberg
   - Mr. Thomas Rogers

3. Civil Aeronautics Board Panel
   - Mr. John Coleman, CAB
   - Ms. Tulinda Deegan, Commuter Airline Association of America
   - Mr. Charles Hutcheson, FAA
   - Mr. James Lightsey, CAB

4. Aviation Consumer Action Project
   - Mr. Cornish Hitchcock
   - Ms. Patricia Vroom

5. Commuter Flight Operations Panel I
   - Mr. Jack Ray, Rio Airways
   - Mr. Edward Weaster, Metro Airlines
   - Mr. Warren Wheeler, Wheeler Airlines

   Commuter Flight Operations Panel II
   - Captain Stanley Bernstein, Air New England
   - Captain Manual Jiminez, Puerto Rico International Airlines
   - Captain Foster Studevant, Coleman Air Transport

6. Commuter Pilot Selection, Qualification, Training and Workload Panel I
   - Mr. Dennis Crabtree, Golden West Airlines
   - Mr. J. Dawson Ransome, Ransome Airlines
   - Mr. John Warning, Atlantic Airlines

   Commuter Pilot Selection, Qualification Training and Workload Panel II
   - Captain Philip Biazzo, Altair Airlines
   - Captain Miles Matousek, Coleman Air Transport
   - Captain George Snyder, Pocono Airlines

7. Commuter Airline Maintenance Panel
   - Mr. Michael Freeman, Air Midwest Airlines
   - Mr. David Long, Command Airways
   - Mr. King McCulloch, International Association of Machinists and Aerospace Workers
   - Mr. Raymond Myers, FAA

8. Commuter Airline Equipment/14 CFR 24 Panel
   Captain Charles Attando, Pocono Airlines
   Mr. Stanley Green, General Aviation Manufacturers Association
   Mr. Joseph Schwind, Air Line Pilots Association
   Mr. Alan Stephen, Commuter Airline Association of America
   Mr. Ersa Tankesley, FAA

9. Commuter Airline Financial Considerations Panel
   Mr. Hershel Connell, Colgan Airlines
   Mr. David Cotton, First National Bank of Chicago
   Mr. Robert Haws, Royal Hawaiian Air Service

10. Federal Aviation Administration Panel
    Mr. Robert Blocker, FAA
    Mr. Richard Collie, FAA
    Mr. F.E. Howe, Rio Airways
    Mr. F. Martin, FAA

11. Honorable Gloria Schaffer
    Member, CAB

12. Mr. Charles R. Foster representing FAA Administrator:
    Associate Administration for Aviation Standards, FAA
    Mr. Foster represented the Administrator, FAA, at the Administrator's request.

END OF SCHEDULED WITNESSES

13. Mr. Steven L. Howard
    Evergreen Helicopters of Alaska

14. Mr. Joseph B. L'Episcopo
    Flight Dispatcher
    Trans World Airlines

15. Mr. Hugh Cunningham
    Hamilton Standard

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