ALASKA LEGISLATURE COMMITTEE FILES 1983-1984 8672

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visited numerous aviation facilities; and attended several aviation related seminars and lectures.

The questionnaire used in the interviews was designed by the research team and modified in response to changes suggested by the Foundation Board of Directors, and to respondents' comments and answers during the first interviews. The interviews were conducted on a one-to-one basis and lasted an average of two hours. Background information, flight techniques and operational conditions in the Alaskan environment were collected from the interviews. Respondents provided a variety of specific techniques which have helped them to prevent hazardous situations from becoming serious accidents. The information in the completed questionnaires was organized into an outline form using a computer. This outline of information provided a data base from which the training objectives were synthesized. The final report contains the unvalidated information from the questionnaires and the training objectives starting at page 76.

The Alaskan aviation training objectives indicate what needs to be taught, the instructional media and devices appropriate for presenting the information, and how to evaluate mastery of the objectives. The training objectives will serve as the basis for further development of an Alaskan aviation training program.

REGIONALIZED APPROACH

Based on information collected in formal pilot interviews and informal conversations with many other Alaskans interested in aviation, a complete Alaskan training system would have to be regionally oriented. There are sufficient differences in flying conditions among geographic regions to warrant training that addresses specific regions in which a pilot operates. Such a regionalized approach would also enable pilots to spend as little time as possible away from their home base to complete a training program. In addition, aviation training in Alaska will emphasize the development and improvement of judgment and decision-making skills rather than the manipulative skills associates with aircraft operation.

In addition to identifying training requirements that address piloting and mechanical skills and competencies, the study also investigated the management of air taxi operations. It became obvious to the research team that some operators in Alaska manage safe, profitable air taxi services. Those factors that contribute to such an operation were identified and serve as training requirements for air taxi management training.

GENERAL FINDINGS: The information collected from the interviews showed that, although some training requirements and the

training objectives to meet those requirements were applicable to Alaskan aviation in general, the majority were specific to different geographical areas in the State and also to different types and configurations of aircraft (single engine, ski, helicopter, multi-engine, float, etc.). It was also recognized that the primary emphasis of an Alaskan training system should be the development of decision making skills on the part of the pilot rather than manipulative flying skills. For example, the training emphasis should be on when to make a 180° turn to escape adverse weather or leave a mountain pass, and include specific operational procedures to be performed on the basis of such a decision.

PRELIMINARY RESULTS: The study identified several factors that had to be considered in the design of an Alaskan aviation training system:

PRIVATE AND COMMERCIAL

1. The primary objective of the training system should be acceptable and applicable to private and commercial aviation operators conducting flight operations in a uniquely stressful environment due to weather, geographic, and other adverse operational conditions.

REGIONALLY SPECIFIC

2. The training system should be tailored to specific

geographical areas of the State and to different types and configurations of aircraft.

LOCALLY AVAILABLE

3. Components of the training system should be accessible to pilots in the community in which they are located. This would avoid, as much as possible, pilots spending time away from their primary job to attend training in a distant geographic location.

PRACTICAL

4. The requirement for training system components for localized on-job-site training could be met by using transportable training devices and interactive audio-visual and print media. These programs should contain instructional components tailored to geographic area and aircraft types.

EVALUATION

5. Instructional programs would be designed to teach specific decision-making skills and the operational procedures to be performed on the basis of such decisions. Evaluation of student performance must be made by qualified, certified airmen with extensive experience in the given geographical area using structured evaluation methods.

DECISION MAKING SKILLS THEN APPLICATION

6. The training system should be capable of allowing the airmen to first learn the necessary discriminations and decision-making capabilities, and then apply these skills in a simulated or operational environment. Non-transportable training devices could be required for operational training.

TRAINING CENTERS

7. Area training centers should be established for specific geographic regions. These training centers could be co-located with existing Community College facilities. The training system would thus permit the learning of needed decision-making skills and operational procedures through transportable media, and evaluation of student performance by designated airmen for localized job-site training. Support and administration for this training would be provided by the area training center.

CHAPTER III

METHOD AND DELIVERABLES

This chapter describes the process which the Foundation proposes to use to transform the results of their report, Definition of Alaskan Aviation Training Requirements, into usable lesson plans and a sample audio-visual training program lesson.

The Foundation will assign persons with expertise in Alaskan aviation needs and experience in development of aviation training programs to work with Alaskan aviation Subject Matter Experts (SME's) for the duration of the contract resulting from this proposal. The Alaskan Aviation Safety Foundation will identify suitable SME's for each type of lesson.

The Foundation will contract with these SME's for a period of time sufficient to convert their unique knowledge into the content of the lesson plan. One to two weeks per SME will be required. Several elements will assist in the success of this process. First, appropriate lesson plan formats have been identified. Lesson plan formats will be presented to the Foundation Board for approval. The approved formats will be the basis for the information gathered from the SME's. Second, the research team has and will continue to use the recommended operational techniques previously identified

by experienced Alaskan aviators in the study. These techniques can be evaluated for efficacy and validated during the development of the lesson plans.

The validated list of techniques will become the "Trigger" which can serve to remind the SME of as many techniques as possible. In the development of some lessons, it is anticipated that several SME's will be required. Where SME's cannot agree on techniques or appropriate procedures for a lesson, the training developers will look to the Foundation Board for guidance or will include alternative methods in the lesson plans. Provisions will be made in each plan for the experienced Alaskan aviator designated to teach the courses from these lesson plans to provide specific information appropriate to the geographical area in which the learner will be operating.

One or two lessons will be selected for development into an audio-visual format. The lesson, which should take approximately 30-40 minutes, may include slide/tapes or video tapes or similar media. It may, for example, train pilots in a subject such as flying through a pass, landing on a beach, checking weather in Alaska or a similar subject. This sample program will demonstrate the use of various media therefore, the cost of this product may not be representative of each training lesson. The sample program will become the standard for transforming all of the lesson plans into

various representative media formats during Phase III of the development of a total training system for Alaskan aviators.

At this time, it appears that the completed lesson plans should number about 25. These would be clustered into the following units:

- Weather in Alaska
- Adverse Weather Flying Techniques
- Takeoff and Landing Techniques for Special Surfaces
- Navigation and Piloting Techniques
- Mountain and Pass Flying
- Area Specific Flying Techniques
- Fuel Management and Handling Techniques
- Cold Weather Operating Techniques
- Hazardous Materials in Alaska
- Survival Training
- Management Training Plans

In addition, a lesson will be developed which will prepare experienced Alaskan pilots and operators to use the plans developed in this project to teach others.

CHAPTER IV

FUTURE PHASES

At the conclusion of the effort described in this proposal, the citizens of the State of Alaska will have a usable product which can have a significant effect on aviation safety in the State. However, although the production of a set of lesson plans is useful and desirable, they do not represent a Total Training System. The lesson plans are a second, but necessary, step in the continuing process of providing safer aviation activities in Alaska through improved training.

The next step is to professionally prepare all of the lessons in an audio-visual, computer assisted and satellite transmittable aviation training program. Even though some Alaskan opinion leaders would prefer that the automated audio-visual programs be produced this year, we believe it is better to prepare the lesson plans and let experienced Alaskan aviators validate their effectiveness before committing the resources to automate them. Then, the Alaska Aviation Safety Foundation can define and build the training media required to produce the best trained arctic pilots possible. Therefore, the Foundation is proposing that each step be taken sequentially and proven before committing to a total training system. This approach will result in the ultimate goal of maximum safety through a "Total Training System" that effectively meets the Alaskan aviation training requirements.

National Transportation Safety Board

Washington, D.C. 20594

January 4, 1983

Office of the Chairman

DUE: ALLW
R 1/20/83

Mr. Lance Wells
Executive Director
Alaska Air Carriers Association
Box 6469
Anchorage, Alaska 99502

Dear Mr. Wells:

As a result of its special study 1/ of air taxi safety in Alaska, the National Transportation Safety Board recommended on September 25, 1980, that the Alaska Air Carriers Association, "Extend its safety program to reiterate the hazards of air taxi operations in Alaska and to overcome, in particular, the 'bush pilot syndrome'" (A-80-105). The Safety Board later classified the recommendation "Closed-Acceptable Action" as a result of your organization's efforts in launching the Alaska Aviation Safety Foundation to promote a safer air transportation environment in Alaska.

The concerns which prompted the Safety Board to conduct the special study of Alaska air taxi operators in 1980 reappeared during a recent investigation. On May 16, 1982, a Gifford Aviation, Inc., deHavilland DHC-6, operated as Wein Air Alaska Flight 517 under the provisions of 14 CFR Part 135, crashed at Hooper Bay, Alaska. 2/ The investigation revealed a casual attitude on the part of the pilots regarding adherence to weight and balance regulations and operating procedures which led to the airplane operating with a center of gravity considerably aft of the published limit. Additionally, the investigation revealed poor maintenance practices regarding the condition of seatbelts in the accident airplane as well as two other DHC-6's operated by Gifford Aviation, Inc. These unsafe practices were precisely the same type noted during the Safety Board's special study and which generated the Safety Board's earlier recommendation to your organization.

Our staff has recently reviewed the "Final Report on Definition of Alaskan Aviation Training Requirements" prepared by American Airlines Training Corporation under the auspices of the Alaska Aviation Safety Foundation. The Safety Board is pleased with the program's content, objectives, and goals and urges its early implementation as soon as funds become available.

Respectfully yours,

Patricia A. Goldman for

Jim Burnett
Chairman

1/ Special Study--"Air Taxi Safety in Alaska" (NTSB-AAS-80-3).
2/ For more detailed information, read Aircraft Accident Report--"Gifford Aviation, Inc., deHavilland DHC-6, N103AQ, Hooper Bay, Alaska, May 16, 1982" (NTSB-AAR-82-14).

EXHIBIT A

Air carriers seek state-funded pilot training

Alaska Daily News 1-1-83

By CHUCK KLEESCHULTE
Daily News business reporter

Prompted by the promise of reductions in current sky-high insurance rates, Alaska air carriers are pushing hard to get a new pilot training program off the ground.

Air carriers over the weekend voted unanimously to seek $780,000 from the state's Legislature to fund the second stage of a proposed training program. It is designed so air taxi operators can offer courses for pilots and ground personnel tailor-made for Alaska weather and flying conditions.

"There is just no question that the aviation industry in this state needs more training. By additional training we can improve safety, cut accidents and reduce the rates air [illegible]s pay for insurance," said Dodson, an official of the newly formed Alaska Aviation Safety Foundation, sponsor of the new training program.

The Alaska Air Carriers Association in 1980, fresh on the heels of a National Transportation Safety Board report critical of air taxi operations in Alaska, hired American Airlines Training Corp. of Texas to study possible improvements in air carrier operations.

The American report completed last year stressed that Alaska's nation-leading air accident rate could be cut if pilots uniformly would be trained to handle Alaska aviation problems and be educated in safety practices so they would avoid wreckless behavior.

"We discovered when we studied Alaskan pilots that most needed more training to learn how to handle many uniquely difficult flying conditions. Flying in white-out conditions and flying where navigation is much more difficult make it important for Alaska pilots to be better trained than those in the Lower 48," says Michael K. Mitchell, an official of American Airlines Training Corp. "Flying out of Bethel daily requires more skill than a commercial 747 pilot ever needs," said Mitchell.

He says Alaska pilots, unlike those in the Lower 48, frequently have to fly by "dead reckoning" and by "pilotage, using surface maps and landmarks to determine locations, rather than nagivational aides.

Mitchell said Alaska pilots especially face the danger of overconfidence promoting poor judgment in flight decisions, the so-called "Bush Syndrome."

To overcome such problems Mitchell proposes drafting pilot lessons especially tailored to Alaska problems, course manuals which Alaska air taxi operators will then use to satisfy Civil Aeronautics Board required refresher training.

Such training manuals, Mitchell said, could be written and in use by the end of 1984, provided funding for the safety program is found by this summer.

Lance Wells, executive director of the AACA, says the expenditure to fund the training program would ultimately benefit all air users through lower air fares, possible because of lower insurance liability premiums.

Dodson said several insurance firms have already promised to provide discounts to air taxi operators who complete the proposed safety program. He said the course also might attract other insurance firms to write policies for Alaska air carriers.

At present only Lloyds of London underwrites aviation insurance given Alaska's high-risk loss history.

The possibility of lower rates is good news to an industry which already has seen nearly a dozen smaller operators go out of business during the past several years because of rapidly escalating insurance rates — the direct result of the state's high accident rate.

Alaska has a rate of non-fatal air accidents five times the rate of the Lower 48, a rate of fatal accidents twice the national average, says Alan L. Crawford, an NTSB regional investigator in Los Angeles.

Crawford during the carrier's annual convention in Anchorage Saturday urged Alaska officials to find funding for the safety program. Wells says carriers have received a commitment from the Sheffield administration to provide at least part of the amount needed for the program in the state's FY 84 budget now under development.

Wells, however, urged carriers to contact lawmakers to try to obtain full funding for the drafting of the training program.

Katherine Fanning
Editor and Publisher

Howard Weaver
Managing Editor

Gerald E. Grilly
General Manager

Steve Lindbeck
Editorial Page Editor

Lawrence Fanning Editor and Publisher 1967 to 1971
Alaska's Only Morning Newspaper • Founded in 1946 by Norman C. Brown

Dec 31, 1985

Upgrade pilot training programs in Alaska

Alaska's air carriers have improved their aim considerably in efforts to shoot down the high cost of flying insurance. The target this legislative season is improved pilot training, and there is at least some chance of success.

Last year the industry sought help from Juneau in the form of legal limits to the financial liability facing air carriers in Alaska. Reducing the carriers' (and thus the underwriters') liability, it was thought, would translate into reduced insurance rates. But the legislation went nowhere — presumably because it pinpointed the wrong problem.

The problem with aviation and insurance coverage in Alaska is the high rate of accidents — not the legal responsibilities arising from them. And the high rate of accidents stems too often from human error arising from the combination of harsh weather, natural hazards, navigational difficulties and unwarranted overconfidence known as "the Bush syndrome."

Industry representatives tacitly admit as much in pressing for a state-funded pilot training program tailored to the special demands of Alaska flying conditions. "There is just no question that the aviation industry in this state needs more training," says Jim Dodson, an official of the Alaska Aviation Safety Program. "By additional training we can improve safety, cut accidents and reduce the rates air carriers pay for insurance."

There may be a battle over who will pay for the training. Air carriers have asked the legislature for $780,000 to fund the second stage of a proposed training program pitched to the needs of Alaska air taxi operators. The Sheffield administration apparently has expressed interest in picking up part of the tab, though a case also could be made for funding the program through a special levy on the industry.

There is little doubt of the pressures, challenges and risks associated with flying in Alaska. But the crucial factor in safely confronting those challenges is the human judgment of pilots who must know their profession better in Alaska than anywhere else in the country. "Flying out of Bethel daily requires more skill than a commercial 747 pilot ever needs," says an official of a company hired to study air carrier operations in Alaska.

That realization alone is enough to justify upgrading pilot training programs in our state. Aviation is a crucial lifeline to every corner of Alaska, and high insurance costs ultimately raise the cost of living throughout the Bush. Working to improve the competence and training of thousands of Alaska pilots can only improve the quality of life in dozens of communities who depend on them.

FINAL REPORT
ON
DEFINITION OF ALASKAN AVIATION TRAINING REQUIREMENTS

FROM
AMERICAN AIRLINES TRAINING CORPORATION

TO
ALASKAN AVIATION SAFETY FOUNDATION
JULY 1982

PROJECT DIRECTOR — M. K. MITCHELL, PhD

PROJECT INVESTIGATOR — C. F. EICHHORN

TRAINING ANALYST — M. J. WILD

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EXECUTIVE SUMMARY

This Executive Summary is designed to give the reader an overview of the background, activities and results of the study entitled "Definition of Alaskan Aviation Training Requirements" conducted by American Airlines Training Corporation. For a more detailed discussion of the topics presented here the reader is referred to the Final Report.

Alaska's dependence on the air taxi industry for delivery of needed goods and services and the safety problems besetting the air taxi operators have been documented in previous studies such as Parker Associates' study, "Air Service to Rural Alaska: A Study in Inadequacy" and a 1980 National Transportation Safety Board Special Study entitled "Air Taxi Safety in Alaska". The NTSB study reported that, "...about 30 percent of all air taxi accidents in the United States occurred in Alaska, and their rate of occurrence was four times that of the accident rate for air taxi operators in the rest of the United States." This accident rate among Alaskan air taxi operators has resulted in a tragic loss of life and injuries sustained, in addition to skyrocketing insurance costs.

In December of 1980, Tulinda Deegan, President of the Alaska Air Carriers Association (AACA) and Executive Director of the Alaskan Aviation Safety Foundation (AASF), asked American Airlines Training Corporation to submit a proposal to develop a training program for Alaskan aviators. In February, American Airlines Training Corporation (AATC) sent Dr. Michael K. Mitchell to Anchorage to meet with the Alaska Air Carriers Association Board and to observe flying conditions in Alaska during the winter.

In the report of his observations to the AACA Board, Dr. Mitchell concluded that flying conditions in Alaska were unique. An unsuccessful effort was made to identify and obtain an existing Arctic training program. Inquiries were made of training personnel in the United States Air Force, the Canadian United Forces, and several Scandinavian countries. Existing training

programs which were being conducted in Alaska were found to be designed to meet recertification requirements of the Federal Aviation Administration (FAA) and were not responsive to the Alaskan operational environment.

The decision was made to develop a specially designed training program suited to the needs of Alaskan aviators. This training program could be based on accident records compiled by the FAA or the National Transportation Safety Board (NTSB). However, such records were often incomplete and, in fact, represented a list of failures. Instead, it was decided to discover how experienced Alaskan pilots learned to cope with the many challenging problems regularly faced by Alaskan aviators. The process of discovery was developed and validated by John Flanagan and reported in Psychological Bulletin in 1954. Flanagan's critical incident methodology in conjunction with traditional job analysis procedures, is the basis for the interviewing process used in this study.

After careful consideration, the Legislature provided funding for the AATC portion of an AASF proposal. The funds were included with those to be administered by the Alaska State Department of Education. A contract was signed by AATC and AASF to conduct the study. This contract included a statement of work which listed the activities and specified the deliverables due during and at the conclusion of the study.

The goal of American Airlines Training Corporation is to provide effective flight training in Alaska, based on information gathered from experienced Alaskan pilots, and AATC's proven capability in aviation training systems. It is believed that this training will produce a highly-qualified, professionally oriented pilot and will result in a lower accident rate. AATC and the AASF also have worked with insurance underwriters attempting to obtain insurance premium reductions for personnel completing the proposed Alaskan aviation training program. Several underwriters have expressed approval of reducing insurance premiums based on training.

The staff dedicated by American Airlines Training Corporation to the Alaskan aviation training requirements study consisted of Dr. M. K. Mitchell, Project Director and Investigator; Mr. C. F. Eichhorn, Project Investigator; and Mr. M. J. Wild, Training Analyst.

During the course of the study the investigators travelled to 54 locations (cities, towns, villages) throughout Alaska, interviewed approximately 177 air taxi operators and pilots, visited numerous aviation facilities, and attended several aviation related seminars and lectures.

The questionnaire used in the interviews was designed by the AATC research team and modified in response to changes suggested by the AASF Board of Directors, and to respondents' comments and answers during the first interviews. The interviews were conducted on a one-to-one basis and lasted an average of two hours. Background information, flight techniques and operational conditions in the Alaskan environment were collected from the interviews. Respondents provided a variety of specific techniques which have helped them to prevent hazardous situations from becoming serious accidents. The completed questionnaires were sent to the training analyst in Dallas/Ft. Worth who organized the information into an outline form using a computer. This outline of information served as a data base from which the training objectives were synthesized. The Final Report contains the unvalidated information from the questionnaires and the training objectives.

The Alaskan aviation training objectives indicate what needs to be taught, the instructional media and devices appropriate for presenting the information, and how to evaluate mastery of the objectives. The training objectives will serve as the basis for further development of an Alaskan aviation training program.

American Airlines Training Corporation believes, based on information collected in formal pilot interviews and informal conversations with many other Alaskans interested in aviation,

that an Alaskan training system would have to be regionally oriented. There are sufficient differences in flying conditions among geographic regions to warrant training that addresses specific regions in which a pilot operates. Such a regionalized approach would also enable pilots to spend as little time as possible away from their home base to complete a training program. In addition, aviation training in Alaska will emphasize the development and improvement of judgment and decision-making skills rather than the manipulative skills associated with aircraft operation.

In addition to identifying training requirements that address pilot skills and competencies, the study also investigated the management of air taxi operations. It became obvious to the research team that some operators in Alaska manage safe, profitable air taxi services. Those factors that contribute to such an operation were identified and serve as training requirements for air taxi management training.

The proposal outlining the continued development of an Alaskan training system is included as section H of the Final Report. Two primary activities are described; an instructional analysis of the training objectives, and specification of the curriculum design and instructional content. A sample lesson is to be produced during the second phase of program development.

General Findings

The information collected from the interviews showed that although some training requirements and the training objectives to meet those requirements were applicable to Alaskan aviation in general, the majority were specific to different geographical areas in the state and also to different types and configurations of aircraft (single engine ski, helicopter, multi-engine, float, etc.) It was also recognized that the primary emphasis of an Alaskan training system should be the development of decision-making skills on the part of the pilot rather than manipulative flying skills. For example, the training emphasis should be on when to make a 180° turn to escape adverse weather or leave a mountain pass, and include specific operational procedures to be performed on the basis of such a decision.

Preliminary Indicated Results

The study identified several factors that had to be considered in the design of an Alaskan aviation training system:

1. The primary objective of the training system should be acceptable and applicable to airmen conducting flight operations in a uniquely stressful environment due to weather, geographic, and other operational conditions.

2. The training system should be tailored to specific geographical areas of the State and to different types and configurations of aircraft.

3. Components of the training system should be accessible to pilots in the community in which they are located. This would avoid, as much as possible, pilots spending time away from their primary job to attend training in a distant geographic location.

4. The requirement for training system components for localized on-job-site training could be met by using transportable training devices and interactive audio- visual and print media. These programs should contain instructional components tailored to geographic areas and aircraft types. Instructional programs would be designed to teach specific decision-making skills and the operational procedures to be performed on the basis of such decisions. Evaluation of student performance must be made by qualified, certified airmen with extensive experience in the given geographical area using structured evaluation methods.

5. The training system should be capable of allowing the airmen to first learn the necessary discriminations and decision-making capabilities, and then apply these skills in an operational environment.

Non-transportable training devices could be required for operational training.

6. Area training centers should be established for specific geographic regions. These training centers could be co-located with existing Community College facilities. The training system would thus permit the learning of needed decision-making skills and operational procedures through transportable media, and evaluation of student performance by designated airmen for localized job-site training. Support and administration for this training would be provided by the area training center.

7. Area training centers would be used to provide additional training, practice, and evaluation through training devices located at the regional facility. Evaluation of student performance at the area training centers would again be made by qualified, certified airmen with extensive experience in the given geographical region using structured evaluation methods.

8. A centralized administrative facility would be required for the administration, standardization, and evaluation of area training centers and job-site training activities. This facility would probably be located in Anchorage.

Acknowledgements

Before commencing with the more formal sections of this report the members of the research team wish to express their thanks to all of the Alaskan pilots and other persons who gave so freely of their time and knowledge. We are impressed with the high degree of skill and dedication of these Alaskan aviators. This dedication is rooted in service to others and has resulted in the development of many techniques which need to be offered to others through a structured training program.

Furthermore, we would like to emphasize that this report is a summary of what the research team learned from the Alaskan aviation community. We asked the questions, recorded the answers and summarized the responses; therefore, the information contained herein is a contribution from many experienced Alaskan aviators.

Particularly we would like to acknowledge and thank the following persons and organizations for providing transportation and accommodations to the members of the research team during their travels in Alaska.

Transportation:

Alaska Airlines
Wien Air Alaska
Reeve Aleutian Airways
Valdez Airlines
Flirite, Inc.
Peninsula Airways
Tularik Creek Lodge
Harolds Air Service
Sunshine Copters
Munz Northern Airlines
Air North
Frontier Flying Service
Livingston Copters, Inc.
Alaska Central Airways
Ryan Air Service

Accommodations:

Walt Audi of Audi Air, Barter Island
Gordon McDonald of Sunshine Copters, Circle
Bill Fisher of Harolds Air Service, Aniak
Marge Baker of Baker Aviation, Kotzebue
Tom Ratledge and Cynthia Andrecheck of Executive Charter Service, Bethel
Bud Graham and Grant Thompson of Cape Smythe Air Service, Barrow

We would also like to thank the members of the Alaskan Aviation Safety Foundation Board of Directors whose dedication was evidenced by their participation in many lengthy meetings.

They are:

Rex Bishopp, President
Chuck Weir, Vice President
Jim Dodson, Secretary Treasurer
Richard Wien
Kenneth Eichner
Arlo Livingston
James Flood
Lowell Thomas, Jr.
George Pappas
Tom Wardleigh

In addition, several members of the Alaskan Aviation Safety Foundation Advisory Committee assisted in the progress of the project with their significant contributions:

D. Craig Clark - AACA
James Wood - Alaska Airmen
Larry Plessinger - American Society of Safety Engineers
Gary A. Linter - ALPA Safety Coordinator
Joy Craig - Ninety-Nines
Kent Woodman - AOPA, Alaska Representative
Gayle Anderson - Rollins Burdick Hunter

Throughout this project their continuous input and wise counsel contributed greatly to the effort. As each milestone in the timeline was achieved, the board members unselfishly donated their time and expertise to review and approve the process and the results.

Finally, we are pleased to express our gratitude to Ms. Tulinda Deegan, President of the Alaska Air Carriers Association and Executive Director of the Alaskan Aviation Safety Foundation, for her foresight, energy and wisdom. Her ready accessibility, guidance and counsel proved invaluable in the successful pursuit of this study.

INTRODUCTION

This is the final report of the activities, processes and results of a study conducted by American Airlines Training Corporation under a contract with the Alaskan Aviation Safety Foundation. This study accomplishes the first step in the program development process which should lead to the establishment of a total training system for Alaskan aviation personnel.

Contractually the results of this study effort are incorporated into this Final Report including, but not limited to:

A. A description of the study methods used and results from the interview process.

B. A list of unranked aviation training objectives for Alaskan aviators.

C. Scenarios of typical flight profiles recommended for each aviation training objective.

D. Specifications for training devices appropriate for each training objective. The specifications include, but are not limited to, descriptions of training devices, cost estimates, and available sources for purchase or lease.

E. A written report of progress made with insurance underwriters relative to possible premium reductions for aircraft operators who complete a training course based on the findings of this study and future program development efforts.

F. A written proposal for implementing a training program for Alaskan aviators. The proposal shall include, but not be limited to, staffing requirements, training facilities, training devices, and cost estimates.

SECTION A

PURPOSE OF THE STUDY TO DEFINE ALASKAN AVIATION TRAINING REQUIREMENTS

This section of the report explains the purpose of the study and its relationship to the need for increased safety in the Alaskan aviation environment as documented in several previous studies. In addition to the need for increased safety, a lack of existing formalized training programs addressing the needs of many air taxi operators has been identified.

Need for the Study

The crucial role of the air transportation industry in delivering supplies and services throughout the State and the high accident rate of the air taxi operations associated with this activity are well documented.

Although reports on the number of miles of roadway in Alaska vary widely it may be generally assumed that there are approximately 10,000 miles of road in Alaska, not all of which are paved. Alaska's area is equal to one-fifth of the rest of the United States, resulting in a low ratio of roadway to square miles. Therefore, hundreds of villages and thousands of citizens are wholly dependent on air transportation.

According to a study by Parker Associates, "Air Service to Rural Alaska: A Study in Inadequacy," ". . . air service plays a major role in the day-to-day lives of every bush resident. Even those Native Alaskans who have never strayed far from the villages of their birth must now depend on air services for many of the essentials of life."

A 1980 National Transportation Safety Board Special Study entitled "Air Taxi Safety in Alaska" clearly illustrates the problem of safety.

> "Alaska, however, has an air safety problem. From 1974 through 1978, the general aviation 1/ accident rate (based on 100,000 hours flying time) for Alaska was more than double the rate for the rest of the United States. More importantly, about 30 percent of all air taxi accidents in the United States occurred in Alaska, and their rate of occurrence was four times that of the accident rate for air taxis in the rest of the United States."

Indeed, the NTSB made a specific recommendation to the Alaska Air Carriers Association, "Extend its safety program to

1/ The Safety Board classified general aviation kinds of flying as air taxi, instructional, pleasure, business, and corporate/executive.

reiterate the hazards of air taxi operations in Alaska and to overcome, in particular, the "Bush Pilot Syndrome"." (Class II, Priority Action). (A-80-105).

In addition to the tragic loss of life and injuries sustained, this accident rate has resulted in substantially higher insurance costs for aircraft owners and operators which are transferred to the customers. Furthermore, an air taxi operator can become involved in a vicious financial cycle causing the operator to accept flights that normally would not be undertaken in order to meet increased costs due to higher insurance premiums. These flights have a higher accident probability which could raise the operators' insurance cost again. American Airlines Training Corporation will, with input from Alaskan aviation experts, develop and implement an Alaskan aviation training program that could reduce the fatality and injury rate of air taxi operations and curtail the rising cost of aircraft liability and hull insurance.

Lack of Existing Training

Good program development methodology begins with a synthesis of existing training programs which address the problems proposed to be solved. AATC and the AACA searched for Arctic training programs appropriate for use in Alaska. Consideration was given to existing Alaskan programs, those available from the United States Air Force, the Canadian aviation community, and Arctic pilots in Scandanavian countries.

The Alaskan Air Carriers Association President came to the American Airlines Training Corporation for help in developing an Arctic training program. Although during the study the research team became aware of existing Alaskan training programs they did not evaluate them and the question of their efficacy remains unresolved.

Dr. Mitchell attended the United States Air Force "Air Occupational Analysis Conference" at Randolph AFB in San Antonio, Texas, in the spring of 1981. He asked if the U.S. Air Force had

an Arctic aviation training program in progress. Air Training Command personnel whom he questioned said they were not aware of any programs. Comments were made that Air Force jet pilots are not subject to the same problems as pilots who fly reciprocating engine aircraft, therefore the Air Force probably would not have an appropriate training program.

However, training developers from the Canadian United Forces attending this conference offered to share their training syllabi. Unfortunately, after several phone calls and letters the response was, except for a brief course for a particular aircraft, Arctic training was not available. It is worthy of note that since the completion of this study, Transport Canada, Air (the Canadian equivalent of the FAA) has written to AATC requesting eleven specific findings from this study.

After having heard a presentation delivered by Dr. Mitchell in Ottawa in April 1982, the Canadian Aviation Safety Bureau chief reported having similar problems with Canadian charter/contract operators.

Through the marketing personnel of Fokker Aircraft, inquiries were made concerning the existence of an Arctic flying program in Scandanavia. The response was negative. No training program for Arctic aviators was reported to exist in the Scandanavian countries.

Finally, a search was made for a list of validated training objectives. Since a list was unknown to the AACA and AASF Board of Directors, the decision was made to develop these training objectives.

Purpose of the Study to Define Alaskan Aviation Training Requirements

The study entitled "Definition of Alaskan Aviation Training Requirements" was designed to synthesize preliminary training objectives and is the first step in the process of developing and implementing an Alaskan aviation training program. It was not designed to stand by itself. It was determined that training is a crucial part of the solution to the air transportation safety

problem. The next step was deciding what must be taught. That was the primary purpose of the present study. The training objectives synthesized from the many interviews conducted by the AATC Program Development Research Team describe what must be taught to enable a pilot to fly safely in Alaska. Additionally, the researchers discovered several practices whereby some air taxi operators contribute to a greater than expected accident rate due to management decisions which do not encourage safe operating practices.

SECTION B

Alaskan Aviation Safety Foundation and American Airlines Training Corporation Background and Philosophy

The summary background and philosophy of the Alaskan Aviation Safety Foundation (AASF) and American Airlines Training Corporation (AATC) is presented in this section.

Alaskan Aviation Safety Foundation Background and Philosophy

At the present time, most air carriers in Alaska do not have standardized training programs. In 1978, the industry established the Alaskan Aviation Safety Foundation, a non-profit corporation designed to foster aviation safety through education programs. The Foundation plans to offer aviation training programs throughout the state.

The first meeting of the incorporators of the Alaskan Aviation Safety Foundation convened on October 3, 1978. Present were Rex R. Bishopp, Richard A. Wien, and James M. Dodson, the Alaska Air Carriers Association Executive Director.

In addition to efforts to secure a tax exempt status, the Alaskan Aviation Safety Foundation held several management and mechanic seminars during the years of 1978 and 1979. During 1979, meetings were held with the Office of the Governor for the State of Alaska to determine whether or not funding for the establishment of the Alaskan Aviation Safety Foundation would be feasible in the 1980 budget. Efforts to secure such funding, however, were set aside as the Alaska air carrier industry wrestled with the proposed legislation to radically alter the economic regulation of the industry within the state. This legislation extending the Alaska Transportation Commission was finally signed by the Governor in the summer of 1980, thus freeing the air carrier industry to focus again on launching the Alaskan Aviation Safety Foundation.

In September of 1980, the incorporators and the Board of Directors of the Alaska Air Carriers Association discussed possible programs to be sponsored by the Alaskan Aviation Safety Foundation. In December of 1980, Tulinda Deegan, President of the Alaska Air Carriers Association and Executive Director of the Alaskan Aviation Safety Foundation, asked the American Airlines Training Corporation to submit a proposal to develop a training program for Alaskan aviators. After meeting in Dallas, it was determined that it would be necessary to develop a specially designed training program suited to the unique needs of Alaskan aviators.

Before the 1981 session of the Alaska State Legislature began, the air carrier industry had several meetings with Legislators to discuss methods of securing funding to launch the Alaskan Aviation Safety Foundation. In February of 1981, American Airlines Training Corporation sent Dr. Michael K. Mitchell to Anchorage to meet with the AACA and AASF Board of Directors and observe Alaskan flying conditions during the winter. Dr. Mitchell concluded that flying conditions in Alaska were unique and that a training program should be formulated using the experience of Alaskan pilots who have learned to cope with the many challenging problems regularly faced by Alaskan aviators.

A written proposal by the American Airlines Training Corporation was delivered to the Alaskan Aviation Safety Foundation in March of 1981. At that time, several formal meetings were held with various committees of the Alaska State Legislature, the Governor's office, and the Division of Insurance.

Dr. Mitchell returned to Alaska and joined Tulinda Deegan to continue the briefings of the Alaska State Legislature in April of 1981. Final decision on funding the Alaskan Aviation Safety Foundation came in late June by way of a direct grant from the Department of Education.

The Department of Education awarded the grant to the Alaskan Aviation Safety Foundation on September 1, 1981. On September 11, 1981, the Alaskan Aviation Safety Foundation and American Airlines Training Corporation finalized a contract to conduct a study to identify Alaskan aviation training requirements.

American Airlines Training Corporation Background and Philosophy

American Airlines Training Corporation (AATC) is a wholly owned subsidiary of American Airlines, Inc., Fort Worth, Texas, and is responsible for the development, marketing, production, and contracting associated with commercial and military training program development, hardware development and associated support services. These products and services are an outgrowth of years of training experience at American Airlines.

The key to safe and successful operation of any aircraft is a highly qualified and skilled pilot. Because of its belief in this basic premise American Airlines pioneered the development of an integrated flight training system over fifteen years ago. In response to increasing regulation, unacceptable accident rates, and non-standardized instruction, American conducted an indepth study to identify problems and find solutions. This study found that airline operations were becoming too complex for existing training programs. A new system was needed which would enhance proficiency and professionalism and bring standardization to aircraft operation.

As a result of the study, American Airlines decided to use a systems approach to training development. American Airlines developed its own programs based on a thorough analysis of their requirements and the types of equipment best suited for the identified tasks. The result was a training system which incorporated a suite of training devices. The areas of change encompassed training techniques, use of computer-based instructional equipment, use of simulation, standardization, and management, plus a phased plan of implementation in which each step was validated before moving to the next phase. The role of the aircraft as a training device was reduced in this system. American learned that total use of its aircraft for instruction was costly, unsafe and unsuitable for much of the training required.

Since 1966, American's utilization of aircraft for training has been successfully reduced by use of ground-based instruction so that today no aircraft are removed from revenue flying for training. During this period, over 131,065 students have received training at the American Airlines Flight Academy, demonstrating that the experience base at American is large. American did not realize immediate and total success with its training systems, but developed them through years of study, analysis and modification. American has proved that one key element of training success is the requirement for continued update and improvement of each program.

Designing a new training system is a detailed and careful process that pulls together state-of-the-art training concepts from a variety of sources and combines them into a unique approach aimed at meeting specific learning objectives. This basic approach is to utilize the most learner-effective and cost-effective means for the task to be taught, combined with a learning philosophy that phases the student through the program in a building-block form. In each step of the process, the student demonstrates a required level of proficiency before progressing to the next phase.

Training any crew member can be ineffective and frustrating if he or she is required to learn facts or skills not related to real-world problems and the actual operating environment. With the development of the U. S. Air Force KC-10 training system, American Airlines conducted an in-depth study of the required skills of each crew member found necessary to operate effectively in their environment. The results allowed American to eliminate, with confidence, many traditional but unnecessary training requirements. Overall, the new step-by-step learning process was improved by development of specific learning objectives that optimized the learning process. AATC is prepared to offer the benefit of American's experience to the Alaskan aviation community for the continuing development of an aviation training program. We believe that AATC is able to provide a total training system that is cost effective and will produce trained pilots of the highest standards. One significant result of better training has been a dramatic improvement in American's safety record.

AATC's experience in designing and implementing training programs with an emphasis on training system development and training to proficiency, plus its aircraft operating experience, provides a user-oriented approach that is unparalleled in the industry. Combining this user knowledge with program design expertise ensures the development and implementation of an effective, efficient program which meets specific customer needs.

SECTION C

PROJECT METHODOLOGY

This section describes the methodology used by the AATC project staff in collecting, organizing and utilizing the information needed to define Alaskan aviation training requirements. An important aspect of the methodology is that the needed information was gathered directly from experienced Alaskan pilots. The methodology utilized and the data collected also allow a logical progression to the next stages in the development of an Alaskan aviation training system.

Basis for Choosing a Methodology

In order to define Alaskan aviation training requirements a methodology for determining those requirements had to be chosen. Two possible sources of information first considered regarding aviation problems in Alaska or similar environments were accident records compiled by the FAA and National Transportation Safety Board (NTSB) and existing training programs dealing with problems similar to those of Alaska.

After reviewing the Alaskan accident records and statistics it was realized that the information was too general and often incomplete to be of use in determining what requirements an Alaskan aviation training program should fulfill. More important, in many cases an accident statistic reflects a failure on the part of the pilot to deal successfully with an adverse situation. A training program to improve aviation safety should primarily teach a pilot to stay out of an adverse situation and also how to deal with a potentially hazardous situation if it should develop. This type of information is not easily obtainable from accident reports.

The second possible source of information for an Alaskan aviation training program was existing Arctic training programs. As previously stated, inquiries were made of training personnel in the United States Air Force, the Canadian United Forces, and several Scandinavian countries. These inquiries brought little to light which pertained to Alaskan aviation problems. Training programs conducted in Alaska often seemed to be designed to meet recertification requirements of the Federal Aviation Administration. In addition, there were courses on "bush" flying being taught through the University of Alaska and the Community College systems but these courses were not perceived to be directed toward training of professional pilots and had little impact on the needs of air taxi operators throughout the State.

After it was determined that existing sources of information would yield little in an attempt to define specific Alaskan

aviation training requirements it was decided to utilize a methodology which would allow the investigators to discover how experienced Alaskan pilots had learned to cope with the many challenging problems regularly faced by Alaskan aviators. This methodology was a combination of the critical incident technique developed by John Flanagan and reported in Psychological Bulletin in 1954 and the job analysis process utilized in Instructional Systems Development (ISD).

Critical (Hazardous) Incident Technique

The critical incident technique is a job analysis methodology but with an emphasis on the determination of critical job requirements. To quote from Flanagan's 1954 article in Psychological Bulletin: "The requirements include those which have been demonstrated to have made the difference between success and failure in carrying out an important part of the job assigned in a significant number of instances." The intent of the critical incident technique as utilized by the AATC project interviewers was to discover those specific techniques utilized by a pilot in avoiding, or successfully coping with a critical situation. The interviewer first asked the person being interviewed (after background information had been collected), "Describe the most hazardous situation you have ever experienced as a pilot in Alaska." (The interviewers used the term "hazardous incident" rather than critical incident to clarify the question.) The interviewers then explained the intent of the question. They asked pilots to describe the hazardous situation, how it was analyzed and how the pilot successfully resolved the situation. This type of questioning created the situation that Flanagan described as one in which, "The cooperating individual described a situation in which success or failure was determined by specific reported causes." To ensure that all relevant data regarding the reported incident were collected, the interviewer had a checklist of information to be gathered, such as the type of aircraft, phase of flight, weather conditions, location, etc. Refer to Section E for details

of the hazardous incident checklist. If the person interviewed had a hazardous incident to describe the interviewer would listen and write the details of the incident in as much a narrative style as possible. The interviewer would seldom prompt, allowing the pilot to describe the incident without interruption. After the initial description of the incident, the interviewer then used the checklist to ensure that all pertinent data were collected and also asked questions to clear up any details he was unsure of.

Job Analysis

During the initial development of the questionnaire it was realized by the project staff that in some cases the pilot being interviewed would not provide a hazardous incident description that yielded useful data. Either the pilot would claim that he or she had never been in a hazardous situation, or provide such sketchy, generalized information that nothing of note could be collected regarding specific, trainable pilot decisions and techniques. To ensure that useful information relevant to the determination of Alaskan aviation training requirements was gathered, the project staff incorporated many other questions into the questionnaire that reflect the traditional job analysis process. A job analysis is the first of three steps in the instructional analysis phase of the Instructional Systems Development (ISD) process. The purpose of the entire instructional analysis process is to determine what must be learned in an instructional program and the first step is job analysis, the process of breaking a job down into its component tasks by observing job performance and questioning those who perform the job being analyzed. The result of the job analysis for this study is a list of training objectives, those tasks a pilot should be able to proficiently perform to do the job of flying an aircraft safely.

Training Objective Synthesis

The training objectives were written after extracting relevant information from the interviews and organizing this information into an outline form. For example, after reading several interviews in which the respondents described their technique for landing on lakes, the training analyst utilized a computer to construct an outline with a major heading for Landing Techniques under which a sub-heading, Landing on Lakes, was inserted. Every time a technique for landing on lakes was described in an interview the technique description was coded to the interview number and inserted under the heading, Landing on Lakes. The result of this procedure was an outline of the observations, techniques and decision-making parameters for flying in Alaska as reported by those pilots interviewed. Some information gathered from the interviews may or may not be accurate, or in the best interest of safety, but it does point out the need for training in that particular area. As an example, much information was collected from the interviews on how to land on a beach, hence the creation of a training objective addressing landing on a beach in a variety of aircraft and configurations (floats, tundra tires, etc.). The specific information collected will be reviewed and evaluated by experienced pilots during the subsequent phases of the training system development process.

Miscellaneous Questions

In addition to questions related to decision making skills and piloting techniques, pilots were asked a number of other questions. These questions were designed to give the research team a better understanding of the pilot's operating environment and to indicate those problem areas a training program would have to address to provide realistic, effective training to pilots from all areas of Alaska. If the person interviewed also had managerial responsibilities in air taxi operations, specific questions were asked about the management of the operation.

Opinion Leaders

The AATC project staff realized that the latter phases of program development would require considerable input and feedback from experienced Alaskan pilots. In an attempt to identify these pilots during the initial interviews, those persons interviewed were asked to name one pilot they would consult about flying in Alaska. Those pilots named were termed "opinion leaders" reflecting the fact that their opinions on flying in Alaska represented the opinions of many other Alaskan pilots. When possible, the locale in which the opinion leader flew and their area of expertise (float, helicopter, etc.) were noted. The project staff thus compiled a list of experts as identified by Alaskan pilots. Those persons named as opinion leaders will be utilized in later phases of training program development.

Interview Critique

To ensure that the interview process was indeed gathering relevant information and that the process itself was perceived favorably by those persons interviewed, the project investigators left an interview critique with a stamped envelope, allowing the respondent an opportunity to answer specific questions and also to comment on the interview anonymously. Respondents completed and mailed in 100 interview critiques to the project office in Anchorage. The questions asked and a total of the responses are presented on the following page.

INTERVIEW CRITIQUE SUMMARY

1. Was the purpose of the interview and the use of the results clearly explained to you?

   Yes - 100 No - 0

2. Did the interviewer allow you to express yourself freely?

   Yes - 100 No - 0

3. Do you believe that the information requested will be relevant to the development of an effective pilot training program?

   Yes - 91 Maybe - 4 No - 4

4. Do you believe that the information requested will be relevant to the development of an effective management training program?

   Yes - 77 Maybe - 7 No - 8

5. Do you feel that any of the information you were asked to provide was in any way threatening to you?

   Yes - 12 No - 86

6. Were questions asked by the interviewer clear? (If possible, please specify the questions below.)

   Yes - 98 No - 0

7. The amount of time the interview took was:

   too long - 6 too short - 8 just right - 75

Examples of comments added to critique form by respondents:

Your company has an excellent idea in this program.

Excellent interview.

Effort is impressive - time allowed to adequately study the problem.

The interviewer is gathering a realistic picture of what we are up against in this business safety wise.

SECTION D

PROJECT ACTIVITIES

The purpose of this section is to describe the different activities carried out by the American Airline's Training Corporation (AATC) staff assigned to conduct the Study to Define Alaskan Aviation Training Requirements.

The following activities are discussed:

- Questionnaire development
- Procurement of maps and materials
- Interviews
- General aviation interviews
- Insurance meetings
- Public relations activities
- Progress Report meetings with the AASF
- Facilities visited
- Aviation seminars and clinics attended

Questionnaire Development

The AATC project staff spent several weeks in Dallas/Fort Worth prior to starting the interviews in Alaska developing the initial set of questions to be used. These questions were based on the perceived purpose of the study, the AATC staff's experience in aviation and training, and guidelines and observations derived from Dr. Mitchell's previous trips to Alaska which included discussions with the AACA Board of Directors and several flights from Aniak (Kuskokwim Delta area) with an air taxi operator. As the original interview questionnaire was written the project staff anticipated some questionnaire modifications would be required during the first weeks of the interview process. As expected, modifications were made after conducting the first several interviews. The AATC staff (both investigators and the training analyst) was involved as a team during the first few interviews, attempting to improve the interviewing process and ensuring that the information would be detailed enough and understandable to the training analyst when compiling training objectives from the collected data. Some questions were unproductive, others needed rewording, and new questions were added. The added questions were suggested by respondents and the team believed they should be part of the remaining interviews. These modifications were discussed with members of the AASF Board of Directors and Gary Fuller, the Project Officer for the Alaskan State Department of Education.

Procurement of Maps and Materials

Materials and information (in addition to that obtained from the interviews) were obtained and utilized throughout the progress of the study. These materials gave the project staff a better understanding of the Alaskan aviation industry, the operational environment and problems faced by the Alaskan air taxi industry. Two important studies, previously quoted, helped the

research team to appreciate Alaskan aviation training requirements. These two studies were "Air Service to Rural Alaska, A Study in Inadequacy" by Parker Associates (1979) and "Air Taxi Safety in Alaska" a study by the National Transportation Safety Board (1980). Other reports and studies were reviewed, including a report on the Alaska State Aviation Weather Station program (SAWS) and a study by Louis Berger and Associates titled "Western and Arctic Alaska Transportation Study" (WAATS). A study similar to the WAATS study is presently being conducted by the Alaska Transportation Consultants group. Ed Peebles was interviewed regarding the progress of the study.

The research team purchased complete sets of Sectional Charts for use throughout Alaska. They also obtained a copy of the Dictionary of Place Names in Alaska for identifying locations referred to by respondents during each interview. One of the questions asked of respondents relates to the geographic areas in which they have flown. The map utilized by the research team when asking pilots where they had flown was the Hydrological Unit Map for the State of Alaska - 1974. This map divides the state into the different drainage areas. With input from the AASF Board and other pilots, the drainage areas were subdivided into regions that represented different operational conditions for pilots. A total of 19 regions were marked on the map. By showing the map to the person being interviewed and asking where they had flown, the research team was able to determine the respondent's breadth of experience. Refer to Figure D-1 for a map of Alaska divided into the 19 geographical regions.

Aviation Sectional Charts were used when greater detail was required or specific locations needed to be identified. Alaska Topographic Series maps, scale 1:250,000 were used to identify features in selected passes throughout the state.

AREAS USED TO IDENTIFY WHERE PILOTS HAD FLOWN

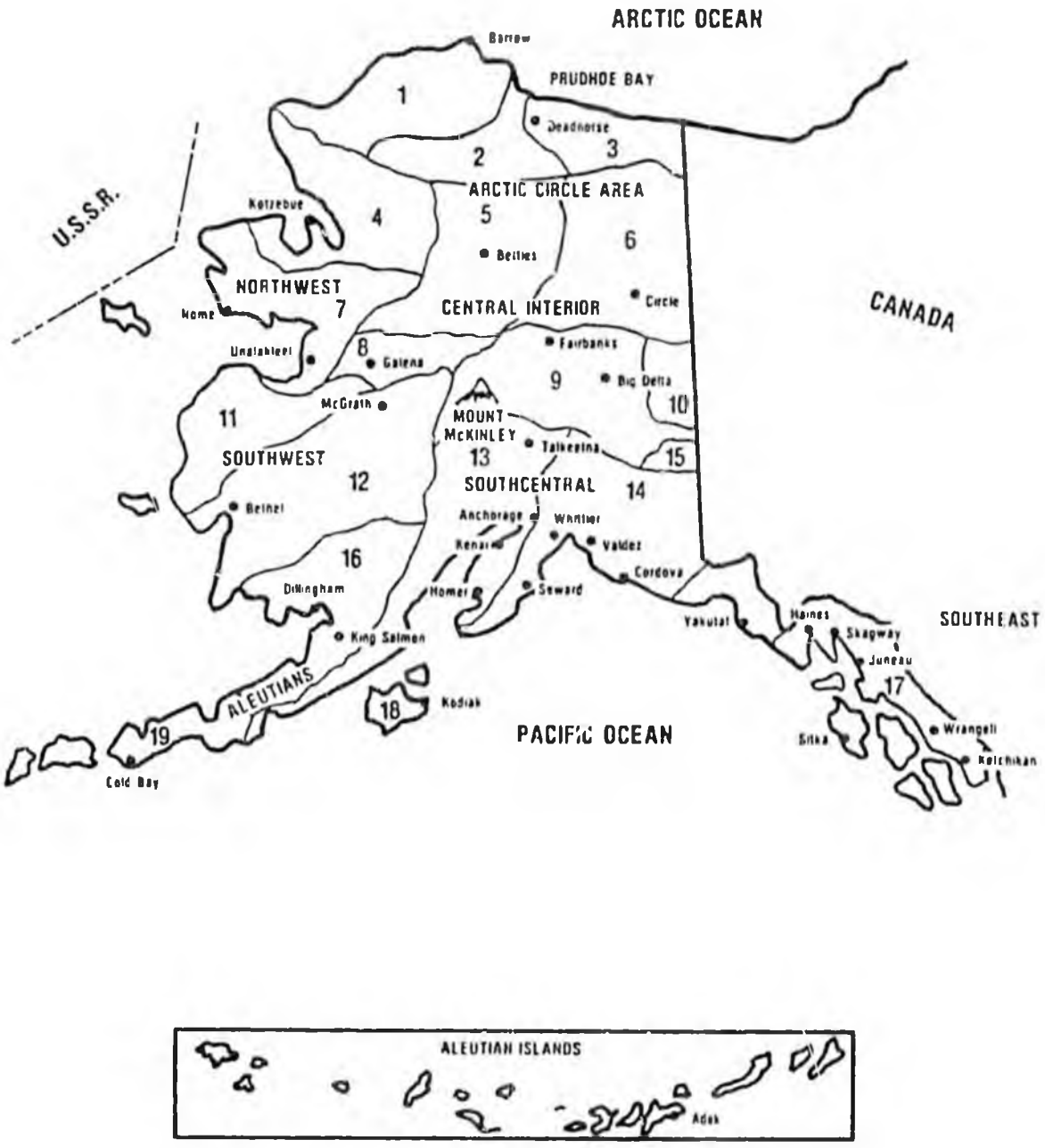


Figure D-1

Miscellaneous materials collected from pilots and operators and FAA sources during the course of the study included various weight and balance forms, company training syllabi, a complete set of FAA Airport Master Record forms (FAA Form 5010-1), FAA accident reports and special purpose charts and maps.

Interviews

The team started interviewing in Anchorage using the FAA list of certified air taxi operators as of June 1981. The AASF Board of Directors recommended those operators who should be interviewed first. The Lake Hood operators were selected for the first interviews since many of them closed for the winter months. During the study the team interviewed many Alaskan aviators who were recommended by their peers because of their skill and knowledge about flying in Alaska. Many productive interviews were obtained as a result of these recommendations.

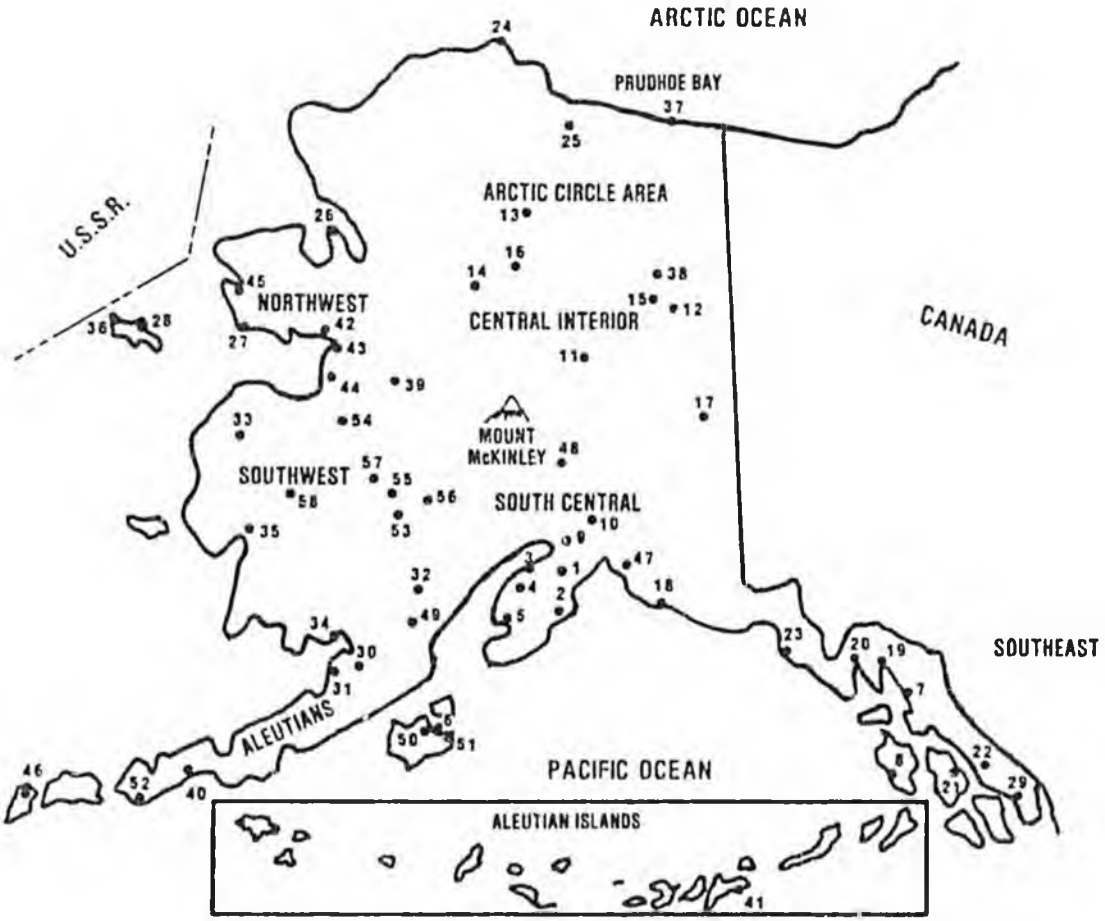
The first cycle of interviews in the Anchorage area lasted approximately three weeks and twenty six interviews were conducted. Once the process was finalized a permanent Anchorage office was set up, and the interviewers worked separately conducting a minimum of two interviews daily.

Since the project office was located in Anchorage, interviews were conducted with Anchorage operators throughout the length of the study whenever staff members were between interviewing assignments.

After the initial round of interviews in Anchorage and a trip back to Dallas/Ft. Worth the researchers returned to Alaska. Mr. Eichhorn interviewed operators on the Kenai Peninsula, Kodiak Island, Juneau and Sitka. Dr. Mitchell drove to Fairbanks and interviewed operators in that area.

During the next phase, Dr. Mitchell conducted interviews in the Anchorage area and continued with operators in the Fairbanks area along Alaska Highways 1, 2, 3, and 4. Mr. Eichhorn interviewed in the Southeastern part of the state and in the interior.

LOCATIONS VISITED



LIST OF LOCATIONS VISITED BY AATC INTERVIEWERS

1. Moose Pass
2. Seward
3. Kenai
4. Soldotna
5. Homer
6. Kodiak
7. Juneau
8. Sitka
9. Anchorage
10. Palmer
11. Fairbanks
12. Circle
13. Anaktuvuk Pass *
14. Allakaket *
15. Birch Creek *
16. Bettles *
17. Tanacross †
18. Cordova
19. Skagway †
20. Haines †
21. Petersburg
22. Wrangell
23. Yakutat
24. Barrow
25. Deadhorse
26. Kotzebue
27. Nome
28. Savoonga *
29. Ketchikan
30. King Salmon
31. Naknek
32. Nondalton
33. St. Mary's
34. Dillingham
35. Bethel
36. Gambell *
37. Barter Island (Kaktovik)
38. Fort Yukon
39. Galena
40. Sand Point
41. Adak
42. Koyuk *
43. Shaktoolik *
44. Unalakleet
45. Teller †
46. Dutch Harbor
47. Valdez
48. Talkeetna
49. Illiamna
50. Port Lions
51. Duzinkie
52. Cold Bay
53. Sleetmute *
54. Holy Cross *
55. Red Devil *
56. Stony River *
57. Crooked Creek *
58. Kalskag *

* Location visited but no interview conducted.

† Location not visited but interview conducted with an operator based there

Figure D-2

During the months of January and February Dr. Mitchell was on the North Slope and spent one week each in Kotzebue, Nome, and Bethel. Mr. Eichhorn interviewed in the Dillingham area, Southwestern Alaska and the North Slope. Both researchers also continued to conduct interviews in Anchorage, as time permitted.

The last two weeks in March, Dr. Mitchell travelled to Adak, Nome and Unalakleet. He then went to Juneau to meet with key legislators to discuss the findings of the project and solicit their assistance in providing further funding for the Alaskan Aviation Safety Foundation. Mr. Eichhorn went to Fairbanks, Galena, Talkeetna, Anchorage, Sand Point, Cold Bay and Dutch Harbor. The team then closed the AATC office in Anchorage and returned to Dallas/Ft. Worth on March 30th.

During the study, the team visited 54 cities, towns and villages interviewing approximately 250 persons. For a map of locations visited refer to Figure D-2. For a listing of persons and companies interviewed refer to Appendix A and the section entitled "Facilities Visited" (p. 31).

General Aviation Interviews

Although the interviews focused on air taxi operators the project staff recognized the importance of obtaining information from the general aviation population. Many general aviation people expressed an interest in contributing to the study and indicated that a method should be found to solicit information from the general aviation population. To respond to general aviation's desire to participate in the study, the existing questionnaire was modified and printed in two editions of Air Alaska, which has a circulation of approximately 12,000 persons statewide. The response was disappointing. Only 20 questionnaires were filled out and mailed into the project offices in Anchorage. Mr. Wild, the training analyst for the project, conducted three interviews with general aviation pilots who were interested in the project and willing to be interviewed. The information gathered reflected many of the same problems identified in this and other studies concerned with Alaskan aviation. Particularly, a lack of weather

information and communication facilities combined with rapidly changing weather and terrain, making flying conditions marginal at best. This is especially true for pilots with little Alaskan flying experience or pilots flying in unfamiliar territory.

Even though the Alaskan air taxi industry, as represented by the AACA and AASF, was the motivating force behind this initial effort to develop a training program, it has always been the goal of all organizations associated with this effort that the proposed Alaskan aviation training program be made available to any Alaskan pilot.

Insurance Meetings

Throughout the study, meetings were held in Anchorage with insurance underwriters and brokers to apprise them of the progress made and the kind of information being collected. The cooperation of the insurance underwriters is essential to the success of the proposed Alaskan aviation training program. By offering insurance discounts to operators whose pilots attend a training program, it is hoped that those operators who would not normally express interest in a training program would be more inclined to have their pilots attend.

In addition to regular meetings with key insurance brokers in Alaska, meetings were held in Anchorage with the following brokers and underwriters from Lloyd's of London:

- Philip Jenkins of Gooda Walker, Ltd
- Chris Holland of C. E. Heath
- Michael Charlesworth of M.E. Charlesworth, Ltd

The meetings with Mr. Michael Charlesworth, a London underwriter, were especially significant, since he stated he would consider discounts to operators whose pilots took the training described by AATC and received a certificate. One result of Mr. Charlesworth's visit was a Telex from him inviting Dr. Mitchell to visit Lloyd's and explain the work of the Alaskan Aviation Safety Foundation (see Figure D-3). The meeting in England was arranged

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2 MAR 82

ATTN: G. ANDERSON

PLEASE PASS FOLLOWING TO M. MITCHELL

AS LEADING LLOYD'S UNDERWRITERS ON MANY ALASKAN OPERATORS
I WISH EXTEND INVITATION BEHALF MY COLLEAGUES AND MYSELF THAT
YOU VISIT LLOYD'S IN NEXT 2 MONTHS TO EXPLAIN TO LLOYD'S AND
LONDON COMPANY U/WRS THE WORK OF THE NEW ALASKA AVIATION
SAFETY FOUNDATION, WHOSE WORK WE VALUE HIGHLY.

YOUR PRESENCE IN LONDON ESSENTIAL TO ASSIST US WITH FULLEST
EXPLANATION OF THIS WORK, SO THAT WE MAY ASSESS THE LIKELY
IMPACT ON AIR SAFETY, AND THUS CALCULATE POSSIBLE PREMIUM
REDUCTIONS FOR THOSE OPERATORS WHO UNDERGO THE TRAINING COURSES
THAT YOU ARE ORGANISING.

REGARDS

MICHAEL CHARLESWORTH

8812338CHARLS G
•
RBH ALASKA AHG

REPLY TO THIS TELEX VIA RCA
T

Figure D-3

and the opportunity to participate was extended to members of the board of the AACA and AASF. The following persons were able to accept the invitation of Mr. Charlesworth:

- Gayle Anderson
- Rex Bishopp
- Ruth Bishopp
- Jim Dodson
- Bill Fisher
- Charles Eichhorn
- Michael Mitchell

A full week of activities was planned by Ms. Anderson and Mr. Charlesworth. Two group meetings were held and attended by 51 persons from Lloyd's. (See Appendix B). Many individual meetings were held in the various underwriters' and brokers' offices.

The results of these meetings were beneficial to both the insurance underwriters and the AACA/AASF/AATC representatives. The Lloyd's of London insurance underwriters expressed the fact that they were impressed with the efforts of the Alaskan Aviation Safety Foundation to improve the safety of flying in Alaska. The Alaskan contingent learned that the prospect of getting any commitment of a discount for those operators whose pilots take the training described by AATC will not be a simple matter. In the words of one underwriter, "The London market is not organized for discounts." However, there was considerable interest among the London underwriters for more information regarding the relative safety of air taxi operators. They supported the concept of an audit or appraisal of air taxi operations by an entity other than the broker. An audit which has been previously tried, by one of the underwriters, has not been considered successful because the evaluation was neither structured nor well documented. Underwriters suggested that training, although very important, was not the only part of the solution to the very complex problem of increasing safety in Alaskan aviation. The underwriters expressed the belief that if they were able to get well documented information on each operator, information which was consistent among

operators and detailed enough, insurance rates could be adjusted to differentiate between the safe and unsafe operations. This differentiation could be significant enough to cause the unsafe operator to either improve his safety record or pay a premium for the higher risk imposed on his pilots, passengers and the underwriter.

Public Relations Activities

In an effort to make the Alaskan public aware of the AASF's promotion of aviation safety and also to explain the purpose and nature of the study, Dr. Mitchell made himself available to various media for interviews. Some interviews and presentations are listed below:

- Several interviews by Bert Tarrant of Air Alaska produced some excellent articles which proved to be most helpful in apprising Alaskan aviators of the need for, progress of and results from the study.

- A television interview by Eric Meindl for the P.B.S. Aviation Weather Special Segment. This interview was broadcast on October 20. Comments from many people indicate that the interview was seen by a large audience.

- Reporter Deb Davis conducted an interview with Tulinda Deegan and Dr. Mitchell for the Anchorage Times. The article appeared in the October 24th edition of the "Times".

- An interview with reporter Everett Long of the Fairbanks Daily News-Miner was published on Saturday, October 31st in the Pilots Corner column.

- An interview with Peter Friend of the Tundra Drum was conducted during Dr. Mitchell's trip to Betnel in February.

- Mr. Eichhorn and Dr. Mitchell spent considerable time with an independent freelance aviation writer, Barry Stott. Mr. Stott is preparing several articles on aviation in Alaska and plans to include comments on the activities of the Alaska Aviation Safety Foundation.

- Other activities included a talk to the Alaska Airmans Association, and a presentation to an aviation safety class at the Anchorage Community College. The research team also coordinated AATC's involvement in the AACA annual convention. The AATC team used this opportunity to describe the project to participants at the convention, both formally, and informally at the AATC trade show booth. The formal presentations by Dr. Mitchell were titled "Overcoming Alaskan Aviation Hazardous Incidents" and "A Study to Define Alaskan Aviation Training Requirements". In addition, many meetings were scheduled throughout the convention with industry leaders and insurance persons.

Progress Report Meetings with the Alaskan Aviation Safety Foundation Board

One of the contractual agreements between AATC and AASF was to deliver a monthly Progress Report on the study, "Definition of Alaskan Aviation Training Requirements". These reports were written at the end of the month and described the progress and activities of the AATC research team for the preceding month.

The first Progress Report was delivered to the AASF Board at a meeting held in their Anchorage office suite at 4790 Business Park Blvd. on Saturday, October 24, 1981, at 10:00 a.m. This meeting was attended by Rex Bishopp, President, AASF; Jim Dodson, Secretary/Treasurer, AASF; Tulinda Deegan, Executive Director, AASF; Jim Wood, President, Alaska Airman's Association; Jerry Smith of the Alaska Society of Safety Engineers; M. K. Mitchell, Project Director, AATC; and Charles Eichhorn, Project Investigator, AATC.

At this board meeting, each section of the first Progress Report was reviewed and input was sought from those attending for any modifications they would recommend be incorporated into the interviewing process. A description of the planned activities of the research team for the months of October and November was presented for suggestions and comments.

The meeting concluded with the AASF Board's approval of the first Progress Report.

The second, third and fourth Progress Reports were also presented to members of the AASF Board for their inputs and recommendations. All Progress Reports were approved by the Board.

The Progress Report meetings with the AASF Board served a valuable purpose by informing the Board members of the study's progress and allowed them to offer valuable recommendations to the research team.

Appendix C contains the milestone and timeline charts for the Alaskan aviation training requirements study.

Facilities Visited

Throughout this study the research team accepted a number of invitations to visit aviation facilities in Alaska. Each visit resulted in an increased understanding of the requirements of the Alaskan aviation community.

Alaskan Regional Headquarters:

- Regional Director
- Chief Aircraft Management Branch
- Hazardous Materials Coordinators
- Accident Prevention Coordinator
- Chief, Investigations and Internal Security
- Airports Division
- Chief, Plans, Programs and Evaluation Branch

Other FAA facilities visited included:

- General Aviation District Offices
- Flight Inspection District Offices
- Flight Standards District Offices
- Flight Service Stations
- Air Carrier District Offices

The research team visited these FAA facilities in Anchorage, Fairbanks, Juneau, Nome, Kotzebue, Gulkana, Bethel and Ketchikan.

Other organizations visited and persons met with or interviewed include:

- "Air Alaska" -
  Bert Tarrant, Editor
- Alaska Airmen's Association -
  Jim Wood, President
  Kent Woodman, Vice-President
- Alaska Department of Commerce and Economic Development -
  Kenneth C. Moore Director, Division of Insurance
- Alaska Department of Education -
  Gary Fuller, Project Officer
  Kerry Romesburg, Executive Director, Commission on Post Secondary Education
- Alaska Department of Public Safety -
  Ray Tremblay, Aircraft Supervisor
  L. Samsall, Pilot
- Alaska Department of Transportation -
  James Moody, P.E., Airport Facilities Branch
- Alaska State Legislature Senators and Representatives
- Alaska Transportation Commission -
  Keith Miller, Chairman
  Walter Kubley, Commissioner
  Hesden Scougal, Commissioner
- Alaska Transportation Consultants -
  Ed Peebles, Transportation Analyst
- Anchorage Community College -
  Larry Kingry, Dean of Instruction
  Dr. Loretta Seppanen, Assistant to the Dean of Instructional Services
  Michael Pannone, Air Traffic Control
  Charlie Williams, Aircraft Maintenance
  Ronald Haney, Aviation Technology
  Charlene West, Aviation Technology and Air Traffic Control
  Ronald Pearson, Aviation Technology
- City of Fairbanks -
  Paul Haggland, Airport Manager
- Department of the Interior - Office of Aviation Services
  Tom Belleau, Flight Training Manager
  Jack Corey, Fixed Wing Specialist

° Federal Aviation Administration -
Lynn Helms, Administrator

° Kotzebue Technical Center -
Russ Lloyd, Mechanics Instructor

° Meteor Data, Inc. -
Frank Price, President

° Municipality of Anchorage, Department of Transportation -
James Dunn, Director
Joe Fonts, Airport Manager, Merrill Field

° National Transportation Safety Board -
John Faulk, Administrative Law Judge
Jerry Dennis, Air Safety Investigator

° 99's -
Joy Craig, President

° Office of the Governor of the State of Alaska -
Jessie Dodson, Special Assistant to the Governor

° Eagle Enterprises -
James Snoderly, Survival Equipment Specialist

° Parker Associates -
Walter B. Parker

° Pathology Associates -
Donald Rogers, M.D., Pathologist

° Rescue Coordination Center, Elmendorf A.F.B.

° Reed Stenhouse -
Bob Carney, Aviation Safety Consultant

° Seaplane Pilots Association -
John Pratt, Jr., Field Director

° SOHIO -
Larry Plessinger, Safety Supervisor

° University of Alaska, Fairbanks -
William Nelms, Jr., Head, Aviation Training Department

° University of Alaska, Fairbanks, Geophysical Institute -
Tom George, Applications Specialist

° University of Alaska, Arctic Environmental Information and Data Center -
Albert Comiskey, Associate, Atmospheric Sciences
James Wise, Alaska State Climatologist

Aviation Seminars and Clinics Attended

Dr. Mitchell attended the following aviation seminars and clinics:

- The Flight Instructor Refresher Clinic conducted by the Aircraft Owners and Pilots Association (AOPA). In his address to the 116 Flight Instructors, Dr. Mitchell described this study, the interview process, the type of information being collected and how the information is being used. Over the three days of the clinic the opportunity was available to hear some concerns of those in attendance and to review existing styles and methods of flight instruction.

- The FAA Aviation Safety Seminar conducted by Tom Carter of the Anchorage GADO at East High School in Anchorage. A presentation of the study was delivered to the approximately 365 pilots present.

- The FAA Aviation Safety Seminar conducted by Don Nelson of FAA GADO. The subject of this seminar was icing and winter operations of General Aviation aircraft.

- The Alaska State Troopers Annual Refresher Training Course. The three day course was held at the National Guard Training Center and the Department of Public Safety Hangar. Among the subjects covered were ski operations, the psychology of safety, propeller care, and many other subjects of interest to Alaskan pilots.

- The Hazardous Materials Seminar taught by Jack Peters and Bill Gray of Wien Air Alaska. This excellent three-day course was a thorough training program on the requirements imposed by the U.S. Government for the transportation of hazardous materials. The students in attendance shared their concerns and problems with meeting the unique needs of customers in the Alaskan Bush while remaining in compliance with the regulations.

SECTION E

INTERVIEW QUESTIONNAIRE AND DATA COLLECTED

The interview questionnaire utilized by the research team and the data collected from the interviews are described in this section. Each question from the questionnaire is presented, followed by a discussion of why the question was asked and the data collected. The last part of this section describes the questions asked of air taxi managers, their responses, and suggestions for management training.

Interview Questions and Data Collected

This section lists each question and explains the reasons for the question or series of questions and presents a summary of the responses. The questions asked during the interview are boxed for easy identification.

Interviewer_____	Number_____
Date _____	Start time_____ Stop Time__
Name _____	Position_____
Business phone_____	Home phone_____
Mailing address_____	

A number was written on the cover sheet (represented above) of the questionnaire; that number was then written on the first page of the questionnaire and the cover sheet removed. This process preserved the confidentiality of the respondent because others can see the completed questionnaire without knowing who was interviewed. However, if in the development of the curriculum it becomes necessary to clarify a technique or process, researchers can re-contact the respondent for further information.

Also included for record keeping purposes was the name of the interviewer, the date, and the time the interview began. If for any reason the interview was cut short, the stop time was recorded. When the interview extended for more than two hours the recording of the stop time could be omitted. Typically interviews took in excess of two hours with many lasting for five hours while one ran as long as eight hours.

In developing the questionnaire consideration was given to the possibility that a respondent might be called from the interview to conduct other business. Therefore, the questions were arranged so those deemed most necessary by the research team were asked first and questions deemed least necessary by the research team were asked later.

How many years have you flown?_____ Total hours____
How many years have you flown in Alaska?____ Total hours____

The purpose of asking these questions was to document the experience level of the pilots interviewed. The results are shown below.

CATEGORY	AVERAGE
Total Years Flown	21
Total Hours Flown	10,343
Total Alaskan Years Flown	14
Total Alaskan Hours Flown	7,007

Describe the type of flying done. (Hunting, fishing, cargo, etc.)

Because of the wide variety of types of flying done by Alaskan pilots the researchers believed it would be helpful to know what type of flying had contributed to each pilot's experience base.

Since it was revealed that each type of flying had its special problems and unique solutions, and, because of the wide variety of flying done by almost all pilots, training should be offered that addresses a variety of operational activities.

If you had to consult one pilot about flying in Alaska who would you choose?

This question was asked in order to satisfy any future requirement to validate the training objectives and techniques by providing a source of pilots whose expertise was recognized by their peers.

The responses were not as precise as expected. Respondents often could not name one pilot whom they believed was the most knowledgeable about flying in Alaska. Usually the answer to this question resulted in multiple responses in which more than one pilot was named and his special area of expertise was specified. Selected personnel from this list will be contacted during further program development activities.

Describe for me the most hazardous situation you have ever experienced as a pilot in Alaska.

The rationale for this question having been described in detail in Section C is summarized here. Flanagan's critical incident method of interviewing is reflected in this question. It is the heart of the process of translating actual successful Alaskan piloting experiences into appropriate Alaskan training objectives. After asking this question the interviewer encouraged the respondent to freely relate the details of the incident which were recorded in narrative style.

Using the Critical Incident Checklist prepared by the researchers, the interviewer ensured that sufficient details had been documented to permit the training analyst to prepare training objectives. The list of questions which follow are from the checklist.

The following WHO, WHAT, WHEN and WHERE questions are self-explanatory.

WHO - was involved (number of passengers, description of flight and baggage)

WHAT - type of aircraft (how many hours in type, aircraft flown previous 90 days)
weather conditions
physical condition of pilot
VR, IR, (Visual reference, Instrument reference)
phase of flight

WHEN - day/season
day or night and dark or light
time in flying career (years and hours)
time in Alaskan flying career (years and hours)

WHERE - latitude and longitude
description of terrain

After determining that the level of detail had been accurately documented in accordance with the checklist, five additional questions were posed regarding the critical incident described. These questions were designed to extract specific cues and actions which the pilot learned to use to avoid a similar hazardous incident from developing.

The five questions were:

- What caused this critical incident to occur?
- What alerted you to the fact that a hazardous situation had (or was) developing?
- What specific actions did you take regarding this incident?
- What specific judgements were made which led to the actions taken?
- What do you do now to prevent a similar situation from occurring?

The responses to these questions were synthesized into training objectives from these reported cues and will be validated by selected Alaskan aviators. They will then be incorporated into formalized training programs.

Ratings	Pvt.____	Comm____	Inst____	ATP____	A____	SEL__
	MEL_____	SES_____	MES_____	CFI____	CFI-I____	
	Tailwheel____		GI____	H____	A&P___	Type___

In addition to the number of hours a pilot had flown, the research team also collected information on the ratings obtained. This data served to give the interviewer an idea of the type and scope of pilot experience. Out of the 177 interviews conducted 145 pilots reported having an instrument rating. The other ratings were not totaled across interviews as the purpose was to validate the experience of an individual pilot rather than the group as a whole.

Which areas have you flown in? 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 All _____ All except those circled _____

During each interview, the respondents were shown the Hydrological Unit Map of Alaska subdivided into major drainage areas. These geographical areas were identified by the AASF Board as each having significantly different flying conditions. Respondents were asked to identify the areas in which they had flown. (Refer to Figure D-1 (p. 22) for a representation of the map used.)

What area do you fly that you consider the most hazardous?

After having identified only those areas of Alaska in which the pilot had flown, pilots were then asked to identify which area, in their opinion, presented the most hazardous flying conditions. The purpose of this question was not to identify the most hazardous area in Alaska, but to cause the pilot to focus attention on one particular area, so that specific go/no go parameters and flight techniques could be solicited in greater detail.

What makes it hazardous?

After the pilots specified the area which in their opinion was most hazardous they were then asked to identify the conditions which made it hazardous.

How do you determine whether or not to fly it?

By asking this question the interviewer gathered information on the judgment factors or cues used to make go/no go decisions.

How do you fly it?

When the pilot identified the circumstances under which they decided to go, the interviewers then inquired as to what special techniques the pilot believed appropriate to ensure a successful flight.

The data from the above four questions were synthesized by the training analyst into training objectives which addressed area specific flight techniques, knowledge of weather sources, and interpretation of weather.

What would you teach me to enable me to fly safely in this area?
How would you teach it?
How often would one have to do this?
What skill level do you believe is required?

The four questions above solicited information regarding the teaching of techniques appropriate for training pilots to fly in this specific area. Many pilots said they were not able to identify specific training techniques to transfer their knowledge to pilots unfamiliar with the area, other than having the inexperienced pilot accompany the experienced pilot on various flights. It should be noted that many operators expressed the belief that this type of training (on-the-job) was inefficient and extremely costly. The training offered or required varied greatly among air taxi operators, as did the skill levels required by the operators.

Do the areas you fly have adequate enroute communication facilities?

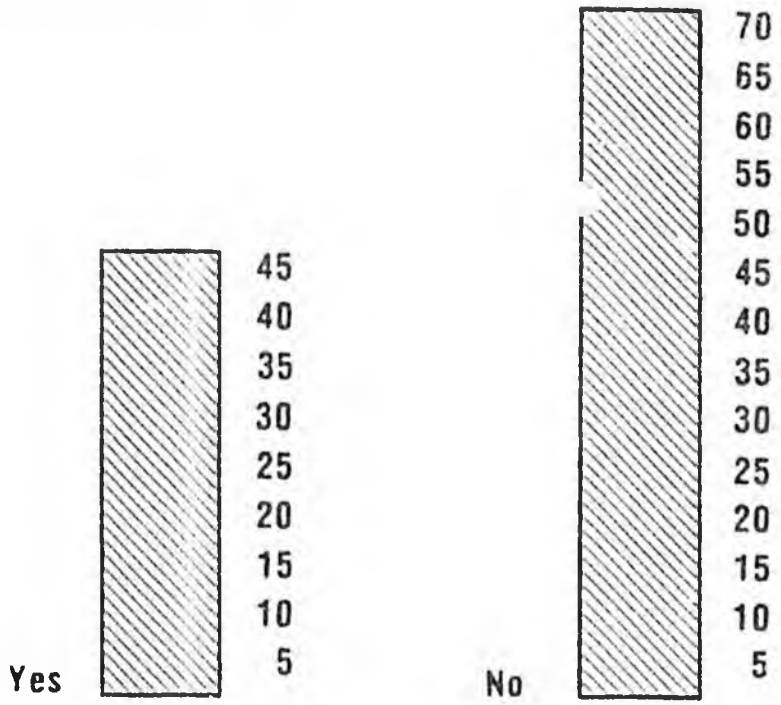
A non-parametric statistical analysis of the responses to this question revealed that there was a significant difference in the opinion of respondents regarding this question, with the majority of respondents indicating a belief that communication facilities were, in fact, inadequate. Refer to Figure E-1 .

Some respondents revealed that when operating at low altitudes or in mountainous areas, signals ordinarily received at higher altitudes were not receivable close to the ground.

A previous study by Parker Associates identified this problem area and made recommendations to correct many of the inadequacies. As a result of the Parker study, the Alaskan Legislature appropriated the necessary funds to construct additional NAV/COMM facilities. Furthermore, the FAA and FCC are presently involved in a program to update and add strategically located communication sites to alleviate this problem.

However, the research team learned that many operators used supplementary communication systems such as SSB, HF, Marine VHF, etc, and utilized cooperative radio procedures and techniques to circumvent the perceived lack of enroute communications. These procedures and techniques will be included in the curriculum of an Alaskan aviation training program.

ENROUTE COMMUNICATION



Do the areas you fly have adequate enroute communication facilities?

COMMENTS

My VHF has better transmission/reception than the FSS radio.

No communication of value in the bush when flying low.

You need an SSB to supplement.

We need more repeater sites and ADF installations.

FAA maintenance is poor on existing facilities.

Facilities are adequate for IFR but not for VFR.

The remote stations don't seem to work very regularly.

Figure E-1

Do you use the following aids to plan weight and balance?

Aircraft owner's manual	_____
Calculator	_____
Company weight and balance forms	_____
Rule of thumb	_____
Other (specify)	_____

Overloading beyond the manufacturer's maximum authorized gross weight may be a contributing factor to the Alaskan accident rate. The research team believed the curriculum should include training in aircraft loading which addresses the unique needs of the citizens of Alaska. Therefore, each respondent was asked for information concerning how they computed the weight and balance for each flight. Seldom did anyone indicate they used methods of loading an aircraft similar to those tested in FAA written or pilot flight tests.

Interviews frequently indicated that aircraft operators used a rule-of-thumb method for determining the total load and weight distribution. Some respondents routinely exceeded the manufacturer's recommended limits. However, they stated that economic pressures forced them to overload in order to be competitive. Other operators stated that overloading was a dangerous form of discounting one's services. Some operators expressed the belief that rather than overload they would complete the trip using two aircraft or fly the lesser weight in two trips.

Some managers stated that overloading of an aircraft had three adverse effects on an air taxi operator's performance: it reduces revenue, it places additional stresses on the aircraft resulting in increased maintenance costs and reduced hull life, and it escalates minor problems to dangerous situations, i.e., an overloaded light twin has a potentially hazardous increase in VMC (Velocity-Minimum Control).

Because weight and balance can affect performance and safety and because the actual loading of most aircraft in Alaska is not consistent with the methods which pilots are normally taught when loading aircraft, it is proposed that hands-on weight and balance training be included in an aviation training program for Alaska.

This training could involve having a typical light aircraft fuselage mounted on a balance scale. The learner would then have the opportunity to experiment with various load configurations. Ideally after having been encouraged to load the training device to its maximum capacity with typical Alaskan "mail", (cases of beverages, pilotbread, Pampers, etc.) the pilot would then fly a simulator which was automatically programmed to perform as though loaded like the weight and balance trainer. Typical simulated emergencies enroute could be programmed to demonstrate to the pilot the potential danger of operating an aircraft in excess of the manufacturer's recommended gross weight.

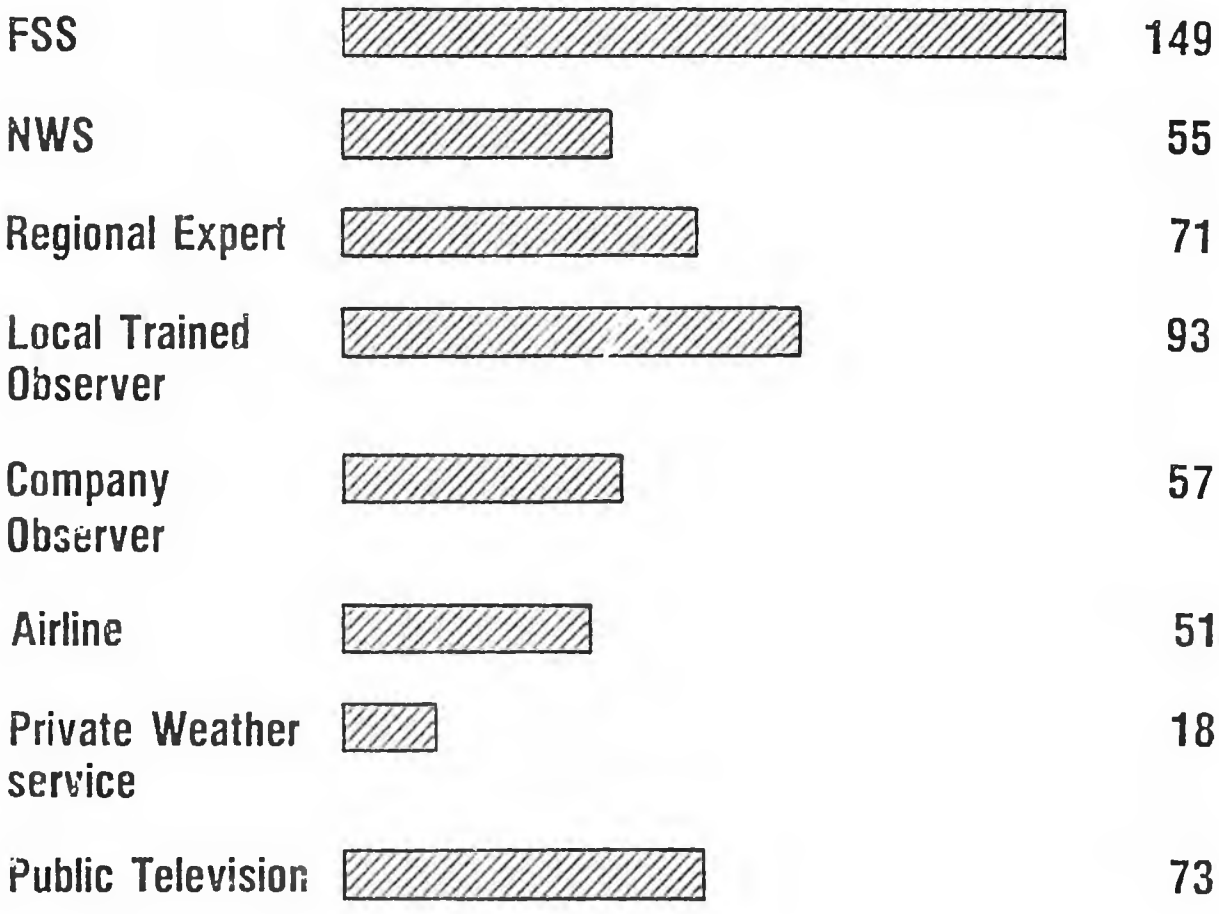
Do you consult the following while planning a trip?			
FSS	____	Airline (telex,Airinc)	____
N.W.S.	____	Private weather service	____
Regional expert	____	Public T.V.	____
Local trained observer	____	Other (specify)	____
Company observer	____		

Most respondents, when asked about pre-flight planning, stated their frustration regarding the ready access to weather information. Having heard this concern expressed repeatedly in the early phases of this study the AATC team decided to ask about sources of weather information. Refer to Figure E-2 for a summary of responses.

Although nearly all pilots made some contact with the FAA Flight Service Stations (FSS) there were mixed feelings about the completeness or accuracy of the information provided. After listening to many FSS specialists and numerous pilots, the problem seems to be that often when a pilot calls the FSS and requests

SOURCES CONSULTED WHEN PLANNING A FLIGHT

Number Of Pilots Reporting Usage



OTHER SOURCES USED

Pilot Reports (PIREPS)
Newspaper
Military Briefing
Marine Weather
Local Untrained Observer
Public Safety Officer Or Trooper, Someone Not Involved In The Flight
Dispatcher Checks With Villages By HF Radio
Canadian Marine Weather Forecast
Forest Service Camps

Figure E-2

the current weather at his intended destination he becomes angry if the FSS specialist begins to provide a systematic and detailed briefing. In time the FSS specialist may wish to alleviate the irritation of repeated criticism by responding with only the answers to the questions asked by the caller. On the other hand, although considerable information seemed to be available on weather in Alaska it was not always reported at the pilots actual destination but within approximately a fifty mile vicinity, and sometimes at much greater distances from the landing site. Pilots have learned to supplement the official weather reporting process by enlisting the aid of cooks at mining and lumber camps, personnel at canneries, home owners living near frequently traveled mountain passes, fishing boat crews, etc. Some airlines (pilots) frequently provided weather information directly to air taxi pilots by radio, as well as through the normal PIREPS given to FSS. Pilots aware of the Aviation Weather program, televised on the Public Broadcasting System, commented very favorably regarding the assistance it provided in gathering and presenting general weather information. They also felt that the aviation education segment of the program was very informative, helping to upgrade their aviation knowledge and capability to analyze general weather trends.

Air taxi operators providing transportation services along coastal areas felt that weather systems frequently came upon them with insufficient warning. This problem was generally corrected by installing special radios with Marine frequencies allowing communication with ships operating in areas with unusual and poorly reported weather conditions.

Do you feel pressure to accept flights in marginal conditions? (From whom - management, self, passengers/customer?)

After speaking to some passengers of air taxi services, the team felt it would be appropriate to ask pilots if they felt pressure to fly in marginal conditions. Refer to Figure E-3 for a

PRESSURE TO ACCEPT FLIGHTS

Do You Feel Pressure To Accept Flights In Marginal Conditions?

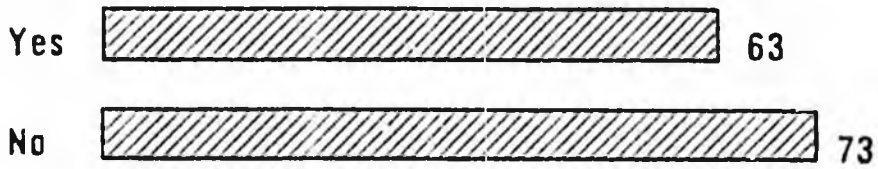


Figure E-3

summary of responses. Frequently, management, attempting to accommodate their good customers, would request its pilots to fly a marginal weather trip, rather than lose business to a competitor who would be willing to go if the original operator refused to go. Pilots attempting to gain recognition as one who could do the job no matter what, frequently pressured themselves to take unfavorable trips to prevent a loss of the "macho" image. Some situations resulted in the pilot and passengers becoming unfavorable statistics through injuries or fatalities. Passengers with the "I must get there" attitude also contributed to a pilot's stress by making requests to continue into marginal conditions.

Pilots should be made aware of the passenger arguments most frequently used to pressure pilots to accept flights in marginal conditions. Management's firm refusal to dispatch flights in these marginal conditions, will reduce exposure to these high risk, potential accident situations.

Describe your personal criteria for whether or not to make a trip in the absence of published minimums.

The intent of this question was to elicit from pilots and/or air taxi management personnel what standards were used for dispatching aircraft. However, the team learned that many pilots operating in the various regions used flexible weather criteria to decide the operational minimums. Frequently, the dispatch of flights was determined by how long it had been since the last flight had been made to a village. Dwindling supplies, medicine, etc. forced operators to conduct flights to these villages in very undersirable conditions. Factors such as enroute terrain conditions, visibility, wind direction and velocities, mountain passes to be negotiated, etc., were considered when deciding to make a trip. Consequently, those variables prevented strict adherance to standards. Management assessment of regional and local

weather conditions and trends, and the areas serviced, could result in developing realistic company weather minimums for the guidance of pilots unfamiliar with the area.

(Helicopter only) Do you refer to the appropriate height-velocity and performance charts before a mission?

When helicopter operators were interviewed, this question was asked to determine if pilots utilized these charts to predict the performance capabilities of the helicopter in their operating environment. Respondents usually stated that these charts were not routinely referred to prior to takeoff.

Do you fly in actual instrument conditions?

Although an instrument rating is required of pilots in air taxi operation, it was discovered that many did not maintain these necessary skills and therefore lost their instrument flying privileges. In addition, many operators opted not to maintain their aircraft in an acceptable instrument flying condition. Unfortunately this situation forced pilots to fly by maintaining visual contact with the ground in very undesirable meteorological conditions, frequently requiring pilots to abort the flight, turn around or press on into dangerous conditions.

How many FAA presentations have you attended in the past 12 months? Why or why not? Do you read FAA publications? Why or why not?

These questions were asked to determine the degree of participation in the free aviation presentations offered by the FAA and the reason for attending or not attending these seminars. Many

respondents complained about the availability (time and location) of these presentations. Some professional pilots felt the presentations were directed toward student or private pilots and did not contain enough useful information for air taxi pilots. Interviews with the FAA Safety Coordinator indicated some of the material did, in fact, have relevance to many degrees of pilot competency and could benefit those attending the presentations. The degree of dedication of the personnel in the FAA Safety program was exemplary and indications were that these men are "putting out good information", thus increasing their credibility, and pilot attendance at FAA seminars. Most pilots stated that they frequently read FAA publications and found them to contain useful information and flying tips that could be applied in their operational area.

Do you use the following navigational aids?		
NDB	_____	Comments -
VOR	_____	
VOR/DME	_____	
RNAV	_____	
ILS	_____	
ILS (BC)	_____	
ASR	_____	
PAR	_____	
DEAD RECKONING	_____	
PILOTAGE	_____	
OMEGA	_____	
LORAN	_____	

When developing a curriculum for training Alaskan pilots it is important to determine what areas need emphasis. It was discovered that the most common method of navigation is by dead

and pilotage. The preference for this type of navigation is determined primarily by the terrain and the meterological characteristics of the area. Whereas all types of navigational methods are available and could be utilized in certain areas of Alaska, the most common electronic navigational aid is the Non-Directional Beacon. This electronic aid is not restricted to line-of-sight and has other operational and cost advantages. Unfortunately, the type of navigational techniques used in Alaska are not given sufficient training emphasis in the pilot programs presently conducted in the Lower 48, necessitating an Alaskan training program to reinforce the ability of pilots to use these methods. Refer to Figure E-4 for a summary of responses.

Do you fly Victor Airways?	_____
Do you fly low frequency airways?	_____

Again, the questions above tried to determine the frequency with which pilots used the enroute navigational systems in Alaska. The general consensus seemed to indicate that the radio assisted enroute system was used infrequently, however many pilots used approach facilities as an aid to finding airports in marginal weather. Refer to Figure E-4.

Do you land on the following surfaces? Describe how you evaluate these surfaces and any special landing/takeoff techniques.

Paved	_____	Gravel	_____	Tundra	_____
Snow	_____	Rivers	_____	Roads	_____
Lakes	_____	Sandbars	_____	Beaches	_____
Sea Ice	_____	Fresh water ice	_____	Mud	_____

NAVIGATIONAL AIDS

Number Of Pilots Reporting Usage

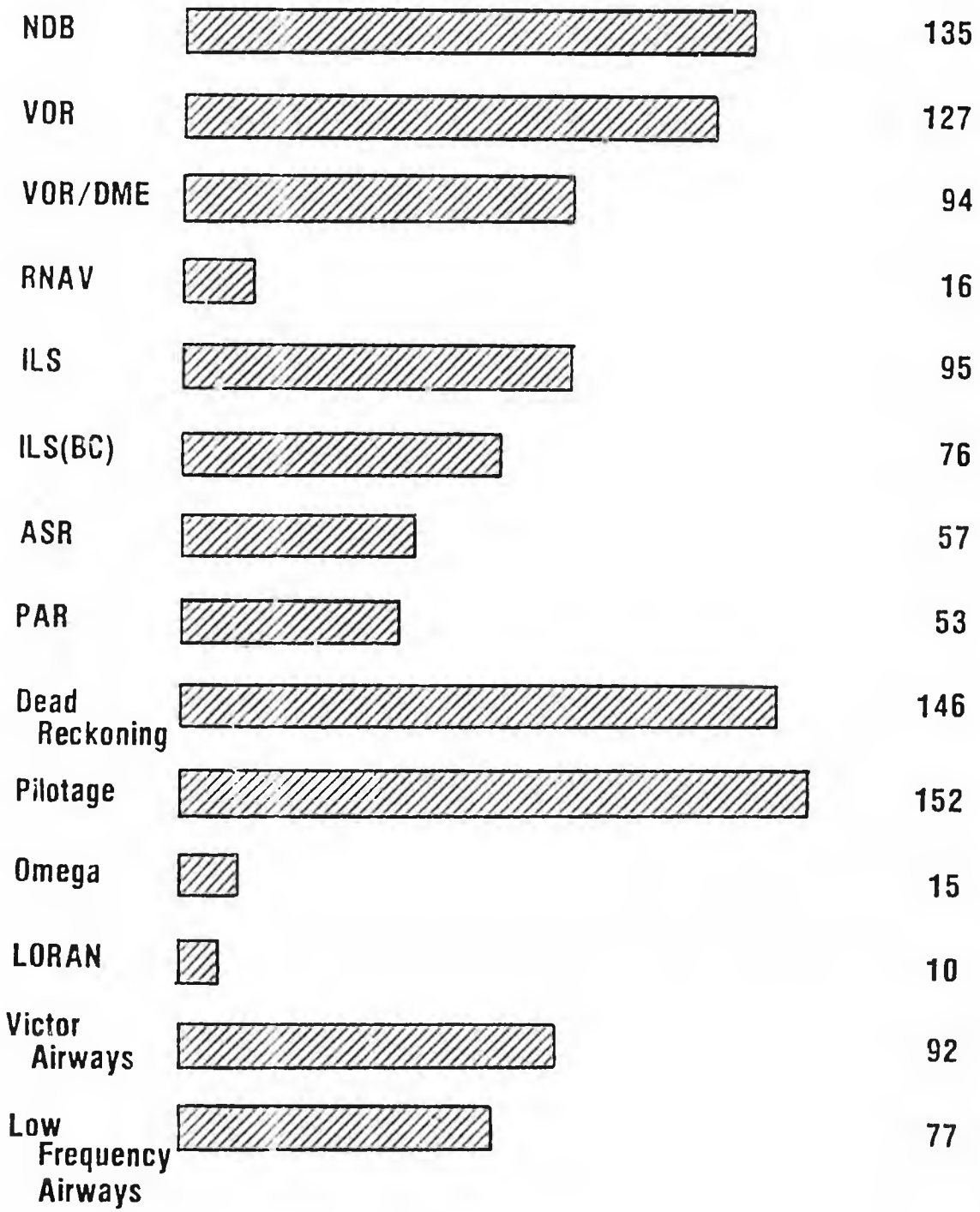


Figure E-4

The interview team knew the demands placed on Alaskan aviators to land on many different surfaces under conditions of varying extremes. Since the majority of these landing sites were away from conventional well-equipped airports, training objectives were developed to be incorporated into the curriculum for Alaskan pilots. In addition to learning to operate airplanes from these unique surfaces, training and proficiency is required of pilots in short and soft fields with high obstacles at both ends, small lakes at elevated altitudes, and in cross-winds with velocities well above the values experienced in the Lower 48. Refer to Figure E-5.

What is your opinion of <u>your initial pilot training</u> effectiveness in relation to safe Alaskan flying?

Many pilots answered this question stating they felt areas of their initial training were definitely lacking. Some of the reported deficiencies were:

- Mountain flying was not included in their initial training course.
- Actual off-airport take-offs, approaches and landing were not part of the initial curriculum.
- Seaplane training and ratings for initial certification were not related to real world pilot requirements in Alaska.
- Short and soft field take-off and landing procedures, although taught, were not practiced in the actual environments.

Suggestions on how the training could have been improved.

LANDING SURFACES

Number Of Pilots Reporting Landings On These Surfaces

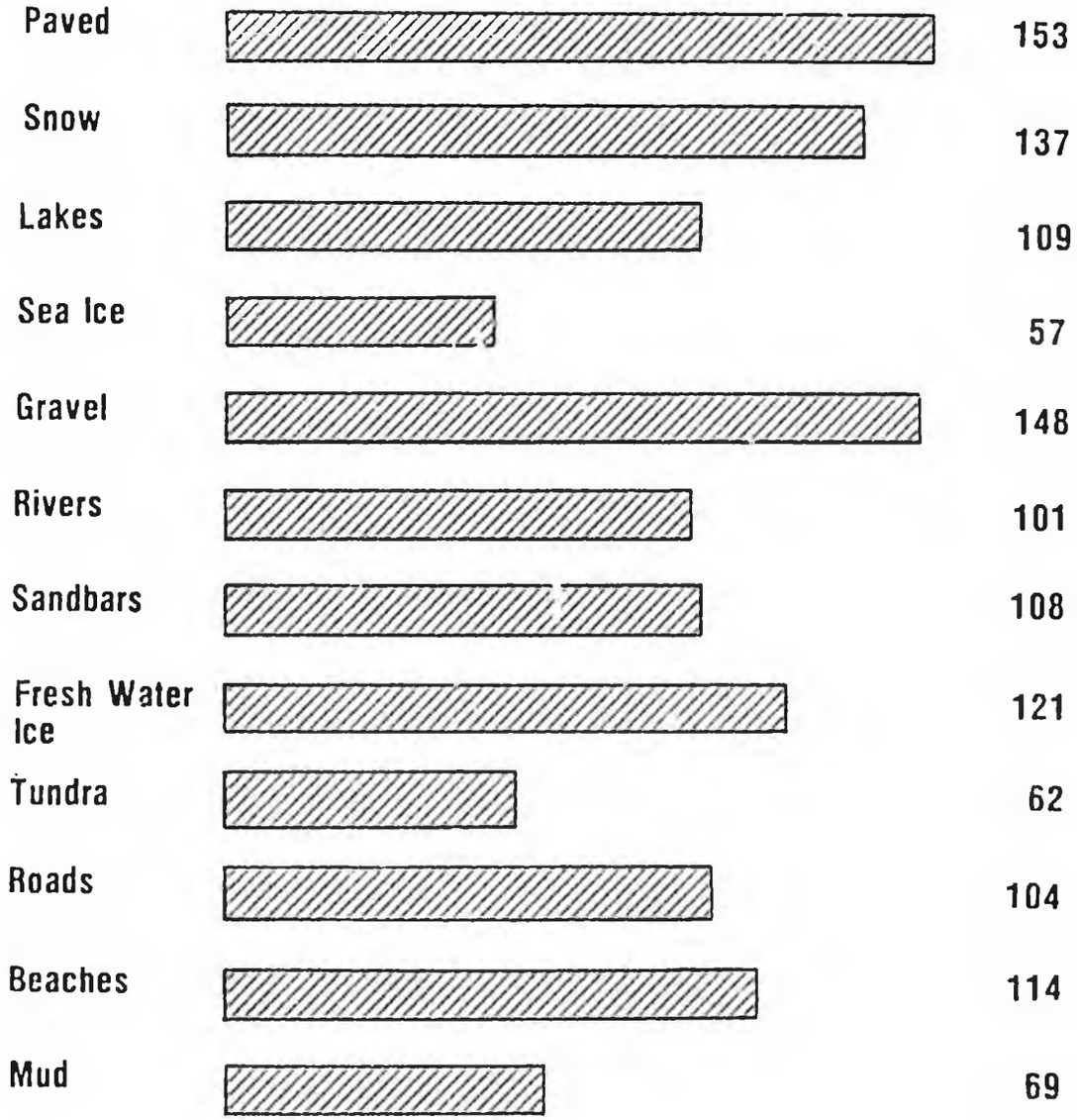


Figure E-5

Pilot recommendations included: incorporating training in operations from actual off airport sites, mountain pass flying techniques, improved proficiency when operating in a strong crosswind, extra emphasis on pilotage and dead reckoning forms of navigation, operating in snow and ice environments along with the illusionary problems associated with these operations. Many other items of required instruction are included in the training objectives.

Describe your Alaskan pilot training.

A surprising number of respondents answering this question indicated most pilots did not receive any formal training to help them cope with flying in Alaska. Most reported they either learned by trial and error or received minimal amounts of on-the-job training. The more fortunate pilots who were in a position to fly as co-pilots for a few yea s expressed much appreciation for being afforded this learning process; some relating the sad experience of their friends lost to the trial and error method used by some operators.

How could it have been improved?

Attending a formal training program seemed to be the most popular response to this question.

Describe your recurrent training.

Recurrent training generally was not conducted by many operators. On the other hand a very few operators did offer impressive, detailed instruction in a wide variety of subjects including survival, winter operations, handling of hazardous material, ground

school classes for aircraft systems and checks by chief pilots of their pilots' proficiency, and operational line checks of these pilots by personnel designated by management.

Are federal aviation minimum standards for training adequate to enable a pilot to fly safely in Alaska?

Most interviewees felt that the manipulative techniques required by the FAA for pilot certification were adequate however, they indicated enhanced training in Alaskan operations would be very desirable. Refer to Figure E-6 for a summary of responses.

What changes do you recommend?

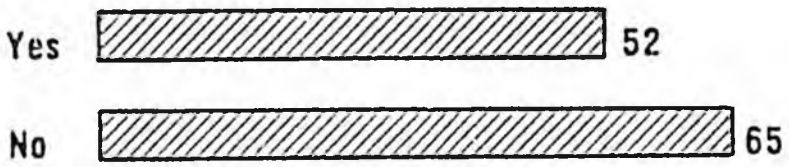
Many of the recommendations that were offered when these questions were answered appear as training objectives for an Alaskan pilot training program.

Which passes in this area do you fly on a regular basis? What cues do you use to determine go/no go? Describe typical conditions in the pass. Describe extraordinary conditions you have encountered. What alternative actions do you plan? Describe any special techniques that you utilize.

The questions above attempted to identify any problem areas associated with flying through passes. During the investigation the interviewers were told about the high accident rate in the passes in the vicinity of Anchorage. Much of the information gleaned from operators flying through these passes is now reflected in the training objectives included in this report.

FEDERAL AVIATION MINIMUM STANDARDS

Are Federal Aviation Minimum Standards For Training Adequate To Enable A Pilot To Fly Safely In Alaska?



COMMENTS

Need a good hard check ride.

Proficiency should be the standard, not time.

Simulator training for cross country in poor weather.

Need additional training for professional flying in Alaska.

Needs heavy emphasis on terrain recognition.

Designated examiners are too lax.

Float rating should include all conditions pilots normally encounter.

Separate rating for taildraggers.

Figure E-6

Are you aware of pilots with an alcohol problem?

YES	93
NO	64

Do you know of pilots violating the 8-hour rule? (none, few, many)

YES	100
NO	50

Although the questions above were not part of the study, the Alaskan Aviation Safety Foundation requested the interviewers to gather this data when talking to pilots and operators. Some respondents initially thought the questions pertained to pilots flying in their own air taxi operation and seemed hesitant to respond, however further explanation of the intent of the questions usually provided them with a willingness to answer. Some asked why questions were not asked about the use of drugs and felt there may be some abuses in that area.

Do you perform the following duties?

Maintenance ___

Loading/unloading ___

Scheduling/administration ___

This question was asked to learn if Alaskan pilots used unique methods of maintaining or servicing their aircraft in the extemely cold and sometime hostile operating environment. Routinely, pilots are required to spend considerable time at the end of

a flying day getting the airplane prepared for the following day's flying. In very cold environments it could mean draining the oil to prevent it from congealing, placing engine and wing covers in position, etc. Lack of maintenance personnel at some locations necessitated pilot involvement in minor maintenance. In almost all cases, the pilot personally did the loading and unloading of the aircraft or supervised the placement of cargo within the airplane. External loads were flown occasionally by some experienced operators. The scheduling and adminstrative duties varied among the operators. The smaller operators had the pilots arranging their own flights while the larger operators utilized office personnel, some using dispatchers, when many routes were serviced.

Management Questions

From the inception of this project the AATC research team was told by many Alaskan aviators that much of the responsibility for the high accident rate in Alaska was due to deficiencies in management policies and procedures. In order to determine the cause of these deficiencies, the decision was made to ask managers of air taxi operations several questions relating to the management of their company.

At first the interviewers had a list of questions most of which were related to information required by the FAA to be included in the company operations manual. Most of these questions could be answered yes or no. After answering only a few of the questions on the form respondents perceived the relationship between the operations manual and the questions, and began to answer each question with "Yes, that's in the company operations manual." For example, the interviewer might ask "Are copies of the company manual available to pilots?" The answer given was nearly always, "Yes, that's required by the Federal Air Regulations." However, many operators were volunteering information on what they thought made their operation safer than their competitors such as "Our operation is safer because we require our pilots to have an ATP, be current on instruments, and have 500