

CIVIL AERONAUTICS AUTHORITY
Private Flying and Planning Division

Confidential Note No. 11

MEMORANDUM CONCERNING AIR CARRIER
OPERATIONS SAFETY PROCEDURE

Prepared by the
Air Transport Section

November
1938

MEMORANDUM CONCERNING AIR CARRIER OPERATIONS SAFETY PROCEDURE

On September 12, 1938 the Operations Committee of the Air Transport Association of America, Inc., presented to the Authority their views and recommendations based on the two-day conference held in Chicago September 6th and 7th. This conference was attended by the Administrator, the Air Safety Board, and others of the Civil Aeronautics Authority and by the members of the Association. These recommendations are analyzed herein and certain conclusions drawn in accordance with your request.

This letter, a copy of which is attached, makes a number of recommendations which can conveniently be divided under nine specific headings as follows:

1. Airports
2. Airway Aids *Recommendation for a - 1000 ft. and 1500 ft. - 600 ft. one way, approach range -*
3. Communications Facilities
4. Operations
5. Policy matters
6. Regulations
7. Schools
8. Traffic
9. Weather

Each item in the recommendations is quoted and considered in order, as follows:

1. Airports

"The expediting of the present programs on airports and airway aids with particular attention to the essential aids on airways now having no such aids and with attention to the modernization of airways, the intermediate fields and other facilities of which are now obsolete or inadequate for the class of equipment being operated on such airways."

Recommendations are included regarding both airports and airway aids. This present discussion will be devoted to the element of airports.

For several years the Airport Section of the Planning and Development Division,, (now designated as the Private Flying and Planning Division) with funds provided by the Works Progress Administration, has undertaken the construction, improvement, and modernization of a number of principal airports under a general program known as the National Airport Plan.

The following may be cited as examples:

- (a) North Beach, New York - to be perhaps the finest airport in the country with the completion date about May 1, 1939.
- (b) Chicago Municipal Airport - project includes the removal of railroad tracks at present installed there and the installation of duplicate runways in all 4 directions, together with a master lighting plan now in course of preparation.
- (c) San Francisco - this is a program for the improvement of Mills Field.

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- (d) Salt Lake - this is an improvement program covering the extension of runways and the completion of new surfacing and contact lighting.

The Operations Committee is asking for expedition of these and other similar programs. Completion depends upon the work now going forward in the Private Flying and Planning Division covering the general study of airports in order to satisfy the provisions of Section 302 (c) of the Civil Aeronautics Act of 1938.

A recommendation is in order as the survey is going forward as expeditiously as possible. In the meantime the various ITPA projects are being pursued as rapidly as funds permit.

2. Airway Aids

"The creation, installation and operation of a federally operated ground system of direction finding stations as a supplementary means of navigation to the radio ranges installed and contemplated."

The Air Mail Service of the Post Office Department conducted experiments with radio direction finders installed on the ground in 1920. This system was used in conjunction with similar installations on the aircraft. Although the results were most promising, they became subordinated to a program of airway lighting and were lost to view until they were adopted in recent years as a valuable adjunct to marine navigation. Later this system was again adapted to aviation use by Pan American Airways, Inc., who, for the past several years, have been using it exclusively throughout the tropics.

and in transoceanic aviation. Within continental United States, where radio ranges are already in use, and where most commercial transport planes are equipped with radio compasses, the system would probably attain its greatest usefulness in supplementing the other two aids mentioned above by providing direct and reciprocal bearings from ground stations to aircraft in flight. Once the errors in the direction finder have been calibrated, minimums can be established faster and with greater accuracy at the ground station than aboard an airplane. Moreover, when this work is done at the ground station, pilot may give his undivided attention to his other duties.

Because of the decision of the Authority to purchase three Adcock type direction finders, the Radio Development Section has just completed specifications for an advertisement for bids, although there is a possibility that a contract may be negotiated with the Bell Laboratories. It is recommended that this project be expedited, so that installation work on the first three stations can be started at an early date at the agreed locations of Newark, Pittsburgh, and Washington. Installation will take some time, and it is most desirable that these stations be ready for calibration by the time clear weather begins next spring and summer. Calibration, and the training of ground operators and pilots in the use of this type of direction finder necessarily must take place in clear weather, or during contact flights.

"The expediting of the Indianapolis instrument landing device installation as a test installation for an enlarged program of such installations at all important points and the prosecution of such final program."

Reference is made to an instrument landing system approved by the Radio Technical Committee, covered by a contract with the International Telephone Development Company in the amount of \$64,870. Since this contract calls for execution within 300 days, installation of the system at Indianapolis should be completed next March. The system includes means by which instrument landing facilities may be provided instantaneously on any one of four runways at the discretion of the control tower.

It is recommended that an additional \$6000 be provided to make possible a permanent installation at Indianapolis as the basis of similar installations at other points. Everything possible will be done to speed up delivery by the manufacturer.

"The study of one-way ranges for expediting air traffic at congested airports under instrument approach conditions."

Apparently, the development of one-way radio ranges is a scientific possibility. This is likewise true of a two-course range. The manifest advantage of the two-course range is that it eliminates the mistakes in identifying any particular quadrant which have been occasional sources of fatal accidents with the standard four-course radio range. With the congestion on present radio range frequencies, it is obvious that such a system of one-way stations must be placed

in the ultra-high frequencies.

It is recommended that the advantages and disadvantages of such a system be surveyed. Among others, the following elements are involved:

- (a) The degree of success attained in the present radio-range tests utilizing ultra-high frequencies at Indianapolis.
- (b) Whether one-way ranges should be utilized supplementally to the present standard range.
- (c) Whether the one-way range should be confined to the role of instrument approach aid.
- (d) Whether a sufficient number of frequencies are available.

"The expediting of the present programs on airports and airway aids with particular attention to the essential aids on airways now having no such aids and with attention to the modernization of airways, the intermediate fields and other facilities of which are now obsolete or inadequate for the class of equipment being operated on such airways."

The subject of airport recommendations has already been considered. With reference to airway aids, it will be noted that the Bureau of Air Commerce in 1937 had available an appropriation of \$3,000,000 for the installation of certain new airways and the modernization of the then existing airways. It was stipulated that this fund could be obligated during the last quarter of the fiscal year 1937.

The program has been concerned largely with the installation of additional simultaneous radio-range stations.

There has been some impatience with the progress made under the above appropriation. This delay appears to have been unavoidable because of the impossibility of securing the delivery of essential equipment from the manufacturers. Otherwise, the personnel of the Bureau of Air Commerce was able to guarantee expeditious service.

With regard to intermediate fields there seems to be a lack of agreement as to what size is acceptable. For example, Pan American Airways in the Alaska service successfully utilizes intermediate fields smaller than those used on domestic airways. The development of a policy in this regard properly should follow the conclusion of studies now being conducted by the Aircraft Section of this Division covering the correlation of take-off and landing performance with airport size. The present program, involving the appropriation of \$2,000,000, is due to be completed by the end of January, 1939.

"One of the items in this matter on which we would urge particular attention is the early completion of surveys and letting of contracts for the items authorized and intended to be included in the 1939 fiscal year appropriations."

With reference to the above recommendations it may be pointed out that the additional \$2,000,000 which has been authorized can be obligated during the fiscal year 1939 and expended in the fiscal year 1940. Although plans are under way looking toward the proper expenditure of these funds by the Airways Engineering Division, formal permission to proceed has not yet been given. It is recommended that such permission be granted in order to expedite the modernization of

airways facilities so much desired by the air carriers.

3. Communications Facilities

"Adequate communication facilities."

This recommendation is too general to be used as the basis for logical comment. The air carriers have from time to time made specific recommendations along these lines which have had the close attention of the Airways Operation and Airways Engineering Divisions.

"The expediting of teletype already authorized in West Virginia."

This recommendation is concerned mainly with teletype facilities for the Washington-Cincinnati airway. All authorized teletype stations on this circuit are now operating with the exception of the one originally intended for front Royal, Va., which has been transferred to Winchester, Va. This station will be commissioned in May, 1939.

"It is our understanding that one of the complications of this problem has to do with radio aid facilities some of which are operated by military and naval authorities and that one of such complications is the allocation of frequencies."

The above quoted comment touches upon one of the most deep-seated difficulties facing aviation. With available frequencies divided among the world powers and with further subdivisions between services in each country, the allocation of radio frequencies for aviation becomes one of the most urgent problems before the Authority. The frequency range between 200 and 400 kc, where all standard radio

ranges are now allocated, is shared with the Army, the Navy, the Coast Guard, and various other services in this country. In addition, this frequency range is used for similar purposes by the Government of Canada. The result has been a congestion so great that it is unsafe to add additional radio range stations. These complications between the military services, the facilities of the Authority, and other users within the above ranges constitute a most difficult situation. The only remedy now available is the continued development of equipment and the utilization of an ultra-high frequency band. Experiments, under the direction of the Radio Development Section of this Division, are now going forward for this purpose. The tests are being conducted at Indianapolis where the Authority has considerable experimental facilities available.

While this project is proceeding satisfactorily, it probably could be expedited through the allocation of an airplane better suited to the necessary radio flight tests than any now available. It is recommended that a bi-motored transport aircraft be provided for the Division for this and other purposes.

"The sponsorship of a coordination of a research program by appropriate agencies looking to the elimination of radio static and of ice on airplanes and thereby the elimination of the fear of such, which items constitute not only a hazard in themselves but the fear of which causes a recognized mental hazard to airmen. A part of the radio static investigation should, perhaps, be along the ultra-high frequency development."

The element of airplane icing will be commented on under the heading "Operations". Radio static in aviation has three main sources - (1) atmospheric static of the type known as "grinders", (2) precipitation static due to electrically charged particles of rain, snow or sleet striking the aircraft and antennae, and (3) man-made static produced by ignition circuits, power lines, electrical therapy equipment, etc.

Static type (1) can largely be avoided by the use of ultra-high frequencies. Extensive development and testing along these lines are advancing both in the Authority and the industry. Progress in overcoming static type (2) is favorable, both through bleeding unbalanced electric charges off the airplane and also through the use of shielding of loops, antennas, lead-ins and equipment. The Radio Development Section has development contracts in force with Purdue University and Reed College covering the field of precipitation static. On the aircraft, man-made static is primarily a matter of ignition noise. An excellent report has just been completed by the Army Air Corps presenting a method of shielding the entire radio circuit which is even more effective than the method presently available. Progress can be termed satisfactory in the entire field of aviation radio static.

4. Operations

"Requests of the non-application of certain provisions of Civil Aeronautics Regulations regarding scheduled operations along airways in the Dakotas and in Southern Texas."

The above paragraph has to do with the requests of Midcontinent Airlines and Braniff Airlines for the non-application of the regulation requiring a ceiling of 800 feet and visibility of one mile. Both companies desire to operate with a minimum of 600 feet and one mile, flying at 100 feet below the overcast rather than 300.

Both companies, Midcontinent in particular, advance the argument that the terrain over which they operate is relatively level and that overcasts frequently remain for two or three days at a time with an effective ceiling of 600 feet or slightly higher. Radio facilities are inadequate for both operations.

In Confidential Note No. 6, entitled "Analysis of Accidents in Scheduled Air Transport", 112 accidents, happening between the dates of January 1, 1934 and February 28, 1938, were studied. Of these accidents 19 occurred in the vicinity of the airways over which operations are conducted by the above companies. Seven of them occurred in hazardous weather and two others in questionable weather. In some of the nine accidents involving serious weather conditions there were severe local storms which were unpredicted. It is recommended that caution be exercised in considering the requested waivers.

"The removal of arbitrary restrictions on private airways including a specific example between Denver and Grand Island, Nebraska."

This recommendation has direct reference to the United Airlines operation over a private airway from Grand Island, Nebraska to Denver, Colorado, via Hayes Center, Nebraska and Akron, Colorado. In

seeking to perfect the navigation of this private airway, United undertook the installation of its own radio range stations at Hayes Center, Akron, and Denver. After completing this schedule the company requested the lifting of all operating restrictions. This request was refused by the Authority on the basis that the radio stations in question had only been and could only be granted experimental licenses, good for three months, with questionable renewal.

The only formula which has been evolved to satisfy this condition has been the lease of the stations and their personnel to the Authority. This arrangement has been consummated in the case of the Denver station. Similar one dollar a year leases are nearing conclusion for the other two stations. On completion, the Authority will be able to grant United full operating privileges over the Grand Island-Denver airway.

"A study of how best to proof-test without putting into premature regular duty new and improved equipment, personnel and operating procedures. As a part of this program affecting the operating procedures we include consideration of the acceptance of not-now accepted weather with the thought that it might be possible to coordinate all of the above with some means of carrying suitable first-class mail by air without passengers thereby expediting first-class mail and providing a proving ground for equipment, personnel and operating procedures without subjecting passenger traffic to such arrangements."

It is believed that this interesting recommendation, designed to provide laboratory routes is primarily intended to be on a non-profit basis as far as revenue is concerned. It contains a worthy objective, as it has been found that new, relatively unproven aircraft are a

source of a considerable number of accidents. The above recommendation provides a means by which new types could be proved without passenger losses. To predicate such service on "some means of carrying suitable first class mail", however, introduces a difficulty. The failure to grant such expeditious service to all first class mail between two given cities would constitute discrimination.

It appears that the Authority, under the Act, has the power under the new certificates of public convenience and necessity, to say whether passengers shall or shall not be transported. It also seems reasonable to assume that there exist conditions which justify the above-recommended type of experimental air mail service. It is recommended that if and when serious consideration is given to granting such service, it be borne in mind that discrimination between mailers of first class mail should be sedulously avoided.

Attention is invited to Confidential Report No. 10 which discusses experimental air mail contracts in detail.

"The sponsorship of a coordination of a research program by appropriate agencies looking to the elimination of radio static and of ice on airplanes and thereby the elimination of the fear of such, which items (radio static and icing) constitute not only a hazard in themselves but the fear of which causes a recognized mental hazard to airmen."

In this paragraph that part of the above recommendation dealing with icing will be treated. The Authority cooperated fully in the development of the anti-icing slinger ring and pulsating boot, and a new project, looking to further improvements during the fiscal year 1940, has already been recommended in the Authority. Some development

work is being carried on by the N.A.C.A. through the testing of fluids, powders and other similar substances when and if offered for test by outside sources.

Harvard University is now concentrating on an icing research program with the help of radiotelemeters flown from the Boston area and through observation of actual ice formation under controlled conditions on Mt. Washington.

It is recommended that the Authority again take an active interest in this problem, as there is ample evidence that the solution of aircraft icing has not yet been achieved. Such a project is properly assignable to the Aircraft Section of this Division and should primarily be aimed at the de-icing of vertical and horizontal stabilizers, control surfaces and wing tips. There also are reports of icing which formed so rapidly as to paralyze present entering edge, boot de-icers. It is recommended that the money requested for such a project be authorized.

5. Policy Matters

"The consideration of a change in basic policy of the regulating body from that which has existed in the past of attempting to make the policing function so paramount that it overshadowed all other functions of the body to a policy in which the fostering and development of aviation shall be given equal consideration with that of the regulating function."

The fostering and development of aviation, a specific duty of the Authority under the Act, can take many forms. In a sense, proper policing is definitely "fostering" when it secures safety.

There is no surer way to foster and develop air transportation than to provide such policing or regulatory action as will serve to prevent accidents. Such a policy assures one of the most positive methods of building greater pay loads.

The provision of airways and airway aids also is a method of fostering and developing aviation. All forward looking acts of the Authority contain fostering elements.

Aviation development is directly provided for in the objectives of the Private Flying and Planning Division. With many potentially valuable projects dormant due to lack of funds and personnel, it is definitely in order and in furtherance of the above to recommend that the Private Flying and Planning Division be apportioned more money to expedite this work.

"At such a meeting the Administrator, or his authorized representative, could do much good by stating a policy that regulations are not an end in themselves but are merely a means to an end, which is safety, and that ~~when a regulation is broken in the obvious interests~~ of safety, there need be no fear of a penalty attached."

The Act itself, by its very introductory language, ties together the elements of safety and regulation. It seems needless simply to restate the obvious intent of the Act.

There is a dangerous element in the final phrase of the above recommendation. If the obeying of regulations is made optional, dependent upon the judgment of those sought to be regulated, such regulations are a waste of words. If certain present regulations are inimical to safety, they should be singled out and redrawn.

"Certain specific suggestions under this heading are discussed elsewhere but one step which might be taken immediately and which in our opinion would add materially to safety during the coming winter would be a meeting called by the Authority between the operators or small groups of operators and the field personnel reporting to the Authority who regulate them."

The above recommendation is not only timely but has been affirmatively acted upon. The Air Safety Board held a meeting with the operators on October 5 during the course of which 11 specific safety measures were thoroughly discussed and the way paved for their adoption. On October 20 there occurred a joint meeting between the operators, the field inspectors and the airway traffic control managers and operators, during the course of which many current problems were discussed. These meetings not only will result in solutions to practical problems, but they afford opportunities for the interchange of ideas, the understanding of viewpoints, and the development of the good will which follows such personal contacts.

6. Regulations

"The simplification of regulations should be undertaken promptly."

The above recommendation crystallizes a feeling in the industry that Civil Air Regulations are too complex and too voluminous. It has been suggested that a digest, similar to that prepared by the Hydrographic Office, containing the pertinent sections of the Civil Air Regulations be distributed to all pilots, field operators, mechanics, and that it be posted on airport bulletin boards. Such a move has already been made in the preparation of the local control area chart upon

which all needed regulatory procedure is placed for the ready use of a pilot in approaching a particular airport. It is recommended that a project be authorized for a general study of the regulations of the Civil Aeronautics Authority, based primarily on the experience of such organizations as the Interstate Commerce Commission, Federal Trade Commission, Federal Communications Commission, etc. It is intended that this proposed project should be concerned simply with setting up a general framework which will take cognizance of the present complex regulatory structure. This system of regulations appears particularly intricate in view of the fact that the aviation industry is now relatively small.

7. Schools

"The study of personnel training programs in conjunction with Item (3) in the list agreed to be performed by the operators."

The Air Transport Section has recommended a project and has prepared information covering a proposed school within the Authority, which apparently satisfactorily meets the above recommendation from the Authority standpoint. It is recommended that such a project be authorized and that on completion the Authority proceed to organize such a school. There is attached an exhibit briefly outlining this idea.

This study to determine the scope and character of a school within the Authority can well be tied to the operators' proposal to organize a training program for their employees. The study should undertake to determine the advisability of interchanging students in those fields where close cooperation is essential. Traffic control,

weather and communication services may be cited as examples.

8. Traffic

"The coordination with the military and naval authorities of some regulation to apply where airways cross over or are closely adjacent to military bases or restricted areas so that certain present problems where traffic coordination has not been, in our opinion, adequately respected by the military and naval operations shall be so respected."

The above recommendation is based largely upon the difficult traffic situations which have developed in the vicinity of San Antonio, Texas and San Diego, California. The present situation at San Antonio is that the Authority radio range at that point has a leg which is so close to Randolph Field that aircraft flying the north quadrant would pass directly over this very important Air Corps training area. By far the easiest solution of this problem would be a change in the course of the radio range leg. It is therefore recommended that the Austin-San Antonio range leg be shifted about 17° to the west which will carry the course about 11 miles to the northwest of Randolph Field. If the power of the Austin radio range station is boosted from 50 to 150 watts, the traffic inbound from Austin to San Antonio can then follow this course to a point north of San Antonio, and thence to the field from the point of intersection with the northwest leg of the San Antonio radio range station. A similar course should be followed by Austin bound traffic thus abandoning the present northeast leg of the San Antonio range which passes almost directly over Randolph Field. With such a change in force satisfactory traffic arrangements can undoubtedly be made with the Air Corps in the San Antonio area.

A solution of the problems presented by the complicated situation at San Diego between civil and military operations is more difficult. The area bounded by the 116th longitude, the 33° 30' latitude, the Gulf of Santa Catalina and the Mexican border is the locale of a considerable concentration of military and civil aviation operations. This area includes a desert region which is used as a bombing, firing, and aerial target range. In addition it is used as a training ground for such activities as instrument flying in formation. The ocean area off the coast line between San Diego and Catalina serves a similar purpose.

San Diego is an important air transport center. International service enters the area from the southeast, and there is also extensive northbound and eastbound traffic. There have been several conferences this year between members of the Authority, and the military services, in addition to meetings in San Diego between the operators and the services. It is believed that these discussions will lead eventually to the establishment of definitely bounded approach areas to the north and east, contiguous to the radio ranges and several miles wide. Undoubtedly the restricted area will then be declared a military reservation. Efficient traffic control of the area will not be feasible unless the civil airways through such a military reservation be 10 miles wide, or at least sufficiently wide to permit successful aviation on instruments, procedure turns, etc.

9. Weather

"Assistance to the Weather Bureau to obtain a greater appropriation regarding the figures shortly to go before the Director of the Budget."

On September 26, 1938 the Administrator addressed to the Secretary of Agriculture a letter setting forth in detail additional aeronautical meteorological service for the year 1940. A further letter was forwarded on September 24 announcing that in addition to the above letter the matter of appropriations would be handled separately. This action satisfies Section 304 of the Act empowering and directing the Administrator to make suitable recommendations to the Secretary of Agriculture.

"Safety would be materially improved if additional weather reporting and collecting facilities were available."

In the above letter of September 26 the Administrator made strong recommendations for extensive enlargement of weather reporting and collecting facilities. Recommendations included temporary meteorological services on 50 airways, providing air mail is to be flown thereon, this temporary service to be made permanent following the installation of teletype circuits. In addition there were included recommendations that all off airway stations report on a three hour basis, that 20 additional radiotelemeter stations be installed, that 35 new off airway stations be provided, and that upper air observations be added for 24 off airway stations now operating.

"We make specific reference to the desirability of:

I Reinstating Pacific Ocean ship reports."

The above letter of September 26 includes a recommendation to increase the number of weather observations, including upper air, from commercial ship stations at sea to four daily. It not only requests an increase in the number of such ship stations but recommends the utilization of coding to increase the speed and volume of the observations. Such service is vital to accurate, long range forecasting. It is of great importance in forecasting weather changes in the west coast area.

II "Expansion of upper air knowledge through additional radiometeorograph stations."

The letter of September 26 recommends the establishment of 20 additional radiotelemeter stations. The Weather Bureau also has strongly recommended enlargement of this type of service, now handicapped by lack of funds. Since July 1, 1938 the Weather Bureau has had six radiotelemeter stations in operation. It desires to install 40 or 50 such stations in order to provide for accurate air mass analysis. As an adjunct to such service Harvard University has just developed an airplane meteorograph. In furtherance of accurate forecasting it is recommended that this program receive the active cooperation of the Authority.

III "Additional standard weather reporting stations."

The above letter of September 26 requests the provision of 35 new off airway stations, the establishment of airway fore-

ncast and general supervising centers at Albuquerque, New Mexico and Billings, Montana and the new standard stations incidental to possible carriage of air mail on 38 additional airways.

"Specific assistance in addition to that listed in Item (1), above, for the Weather Bureau to obtain temporary additional funds for supplementing the collection and dissemination of weather during the coming winter, which, it is understood, cannot be obtained by routing procedure through the Director of the Budget."

A canvass of the Authority fails to shed much light on the above recommendation. It is, of course, impossible to secure additional funds in the manner suggested. The only possibility would be a deficiency appropriation, which could be justified only by a serio situation confronting one or more of the air carriers. It is recommended that Mr. Damon be queried further in order to determine whether such serious situations actually exist. It is beyond the scope of the recommendations contained in the above letter of September 26.

"The manning and equipping of all Civil Aeronautics Authority radio range stations intended to be supplied with weather observers with such observers and necessary equipment. It is believed that the problem facing the Bureau of Air Commerce in the past in this connection was one of obtaining men with adequate weather observation training who could also pass the teletype transmission tests which were relatively recently inaugurated and if this information should prove upon your investigation to be correct, it is our suggestion that consideration be given to the retention of personnel with adequate weather observation experience regardless of teletype ability until such time as adequate replacement with both qualifications can be procured."

The above recommendation apparently is based largely on the case of two operators in the Southwest who were temporarily suspended because they failed to qualify with the required teletype speed of 35 words per minute. This matter of teletype operating speed is most important. The investment in teletype equipment is large and the information which must be conveyed over this system is vital to safety. Obviously, slow operators who temporarily must monopolize the time of the entire circuit, would not only seriously reduce the capacity of such circuit, but they would likewise tremendously reduce its economic efficiency. It is useless to obtain adequate weather information if it can not be efficiently dispatched over the teletype system. With the number of teletype drops on the principle airways, the transmittal of such information becomes impossible unless there is reasonable operating speed. Conferences were held on October 4 which it is believed served to iron out some of the misunderstandings on this point. It is recommended that the 35 word per minute requirement be continued as it is not believed this is an unreasonable condition. It should be remembered that one or two inferior operators on a long circuit containing a number of drops could seriously curtail vital information. Although it is so important to have teletype operators capable of maintaining an operating speed of at least 35 words per minute, it is agreed that the ability to accurately observe weather conditions also is important. No cases are now known where the latter ability has been sacrificed to the former. It is recommended that the operators be asked to supply specific cases, if there actually are such, so that remedial action can be taken.

Subsequent Action

One of the results of the Chicago conference of September 12th was the organization of a sub-committee which met in the offices of the Authority on October 5th, 1938, under the auspices of the Air Safety Board. As a result of this conference, attention was directed to a subject of outstanding importance - the advisability of slowing down air transport schedules through a reduction in engine horsepower output while cruising.

For normal cruising at altitudes of 8,000 feet or more, a reduction in the horsepower output to 45-50 percent will result in a block to block speed of 165 miles per hour for the Douglas DC-2 and DC-3; of 167-170 miles per hour for the Lockheed 12 and the Lockheed Electra 14, the exact speed being dependent upon the type of engines installed.

Such a reduction in cruising speed not only would improve safety, but in addition would have the following added advantages:

1. Reduce the gasoline consumption thus, providing greater fuel reserves without lessening pay loads.
2. Increase the reliability of power plants and extend their useful life.
3. Reduce operating expenses by increasing the time between overhauls and by decreasing replacement of parts.

The reduction in speed resulting from such a program of decreased engine cruising power would necessitate a general revision of schedules.

It is recommended that there be a reduction in engine horsepower output to 50 percent for cruising purposes. It is further recommended that airline schedules be revised on the basis of established block-to-block time averages, in both directions, from station to station, using a known percentage of horsepower in normal cruising on the prescribed climb, cruising and descent profile for each section of the route. Averages established in this manner should take into consideration wind direction and velocities for every month in the year, calculating the effect upon schedules in both directions. This procedure will permit schedules to be revised in a form sufficiently flexible to allow cruising at a reduced horsepower of 50 percent or any other given amount, as may be deemed necessary.

It is significant that the airlines are already falling in line with this general proposition of reducing cruising power for the sake of increased safety. Particularly is this true of the coming winter season, as is evidenced by the following paragraph quoted from a memorandum issued by Transcontinental & Western Air, Inc., to its employees:

"The Management will welcome a lowered operation performance through adhering to a very conservative operating policy if the safety factor can be maintained at 100%. I assure you no employee need fear censure for cancelling or delaying the flight, regardless of the flight advisory previously issued, if in his mind, there is any question of doubt that a flight cannot be conducted conservatively and safely to its destination. Neither will an employee be criticized or censured for failure to approve equipment or an operation if there is any hazard or doubt involved."

A copy of the memorandum, which is quoted in part above is attached herewith.

It seems apparent from the events which have occurred in the past several months that there is developing a new attitude by the operators in air transportation. It is a healthy sign that those in responsible places are willing to subordinate speed to safety. This fact has far reaching implications. Not the least of these is the opportunity now presented to attack the fundamental matter of airplane design which has, in the last five years, seen important aerodynamic characteristics sacrificed in some degree to a desire for ever higher speeds.

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September 12, 1938

Mr. Clinton M. Hester, Administrator
Civil Aeronautics Authority,
Washington, D. C.

Dear Mr. Hester:

It is our pleasure to confirm herewith our understanding of a summary of the constructive steps outlined for consideration and action as a result of the two-day conference which the Civil Aeronautics Authority, the Administrator and the members of the Safety Board held with the Air Transport Association of America and its members in Chicago September 6th and 7th.

Before enumerating the points I would like to take this opportunity to express our appreciation of the cooperation and the sincerity of purpose of yourself and all the members of the Authority and staff who were present. We particularly appreciated the presence of yourself and the members of the Safety Board in our detailed meeting on the morning of the second day and the intelligent and sympathetic attitude toward our problems which was displayed.

In order to arrange in the most constructive manner the various recommendations, I have placed them in two groups --

1. Steps to be taken by the operators.
2. Recommendations made to the Authority.

In the case of items recommended to the Authority they have been further sub-divided first, into items which, if looked upon favorably by the Authority, may be prosecuted to the extent of bringing forth relatively immediate results within the next few weeks and, secondly, into items which are sufficiently more elaborate so that they will require more time but which, if looked upon favorably by the Authority, prompt and immediate action should be taken.

All of these items have been selected strictly from a basis of safety. Any economic or other factors which appear in any of them are purely incidental to the main objective of improving safety. We desire at this time to express further our appreciation of the importance of safety in our operations as recognized by the personnel of the Authority and agree fully that this item is of paramount importance at all times in this industry.

STEPS TO BE TAKEN BY THE OPERATORS:

To agree in the interests of safety at all times including the coming winter:

1. To pledge the operators to a prompt reiteration of the safety principle. As a part of this program we are specifically attempting to lengthen critical running times; to review and, if desirable, raise weather limitations and to notify all personnel in the operations departments of the companies of the policy of conservatism in operations.
2. To make available to the Authority a small sub-committee of operators for any specific contact and work on which such a committee can assist the members of the Authority.
3. To give consideration to the further extension of employee training programs.
4. To give consideration to, and to report to the Authority as soon as such consideration can be promptly crystallized, upon the list of questions submitted by Mr. T. O. Hardin, member of the Safety Board, at the meeting on Wednesday morning, September 7th.

MATTERS RECOMMENDED TO THE AUTHORITY

Items on which practical results may be obtained promptly:

1. Assistance to the Weather Bureau to obtain a greater appropriation regarding the figures shortly to go before the Director of the Budget. In this connection, it is our opinion that the Weather Bureau's results to date have been highly satisfactory based upon the funds made available. It is our further opinion that safety would be materially improved if additional weather reporting and collecting facilities were available. We make specific reference to the desirability of:
 - a. Reinstating Pacific Ocean ship reports.
 - b. Expansion of upper air knowledge through additional radiometeorograph stations.
 - c. Additional standard weather reporting stations.
 - d. Adequate communication facilities.
2. Specific assistance in addition to that listed in Item (1), above, for the Weather Bureau to obtain temporary additional funds for supplementing the collection and dissemination of weather during the coming winter, which, it is understood, cannot be obtained by routine procedure through the Director of the Budget.

PROPERTY OF
CIVIL AERONAUTICS
AUTHORITY

3. The manning and equipping of all Civil Aeronautics Authority radio range stations intended to be supplied with weather observers with such observers and necessary equipment. It is believed that the problem facing the Bureau of Air Commerce in the past in this connection was one of obtaining men with adequate weather observation training who could also pass the teletype transmission tests which were relatively recently inaugurated and if this information should prove upon your investigation to be correct, it is our suggestion that consideration be given to the retention of personnel with adequate weather observation experience regardless of teletype ability until such time as adequate replacement with both qualifications can be procured.

4. Prompt action on many miscellaneous items which were pending and in the hands of the Bureau of Air Commerce at the time of the passing of their authority to the Civil Aeronautics Authority, such as --

- a. Requests of the non-application of certain provisions of Civil Aeronautics Regulations regarding scheduled operations along airways in the Dakotas and in Southern Texas.
- b. The removal of arbitrary restrictions on private airways including a specific example between Denver and Grand Island, Nebraska.
- c. The expediting of teletype already authorized in West Virginia.

In accordance with your request it is our understanding that any operator having any matters pending with or unapproved by the old Bureau of Air Commerce which he feels has either been shelved due to the transfer of authority to your organization or which for any reason he may desire to reopen shall feel free to do so.

5. The coordination with the military and naval authorities of some regulation to apply where airways cross over or are closely adjacent to military bases or restricted areas so that certain present problems where traffic coordination has not been, in our opinion, adequately respected by the military and naval operations shall be so respected. It is our understanding that one of the complications of this problem has to do with radio aid facilities some of which are operated by the military and naval authorities and that one of such complications is the allocation of frequencies on which Mr. Paul Goldsborough, President of Aeronautical Radio, Inc., National Press Building, Washington, D. C., is well informed and desires us to offer his aid to you in case he can be of any assistance in the matter.

6. The consideration of a change in basic policy of the regulating body from that which has existed in the past of attempting to make the policing function so paramount that it overshadowed all other functions of the body to a policy in which the fostering and development of aviation shall be given equal consideration with that of the regulating function. We are encouraged to suggest this as a result of the very instructive and helpful attitude shown by all members of the Authority at this meeting. We feel that this item while the least tangible of all those mentioned has probably the most far reaching results in its effect upon safety of the items which have been listed. At the present time the fear of breaking a regulation, many of which are quite complicated and will be discussed with reference to that phase below, causes both airmen and operators to attempt to conduct operations with meticulous conformity to the rules regardless of specific cases where a deviation from the rule would undoubtedly have resulted in a safer condition. Certain specific suggestions under this heading are discussed elsewhere but one step which might be taken immediately and which in our opinion would add materially to safety during the coming winter would be a meeting called by the Authority between the operators or small groups of operators and the field personnel reporting to the Authority who regulate them. At such a meeting the Administrator, or his authorized representative, could do much good by stating a policy that regulations are not an end in themselves but are merely a means to an end, which is safety, and that when a regulation is broken in the obvious interests of safety, there need be no fear of a penalty attached. Such an expression by the Authority would in our opinion accomplish many desirable items. It would remove a fear which often causes people to consider regulations rather than safety itself. It would impress certain field personnel of the Authority with the fact that safety and not policing of regulations is the ultimate objective. It would impress the operators and the personnel with the same idea and it would tend to remove a very definite mental hazard on the part of airmen which last in itself should reduce exposure to accident and thereby improve the matter of safety.

Items on which we believe action should be started promptly but which because of their nature will take time to develop:

1. The creation, installation and operation of a federally operated ground system of direction finding stations as a supplementary means of navigation to the radio ranges installed and contemplated.
2. The expediting of the Indianapolis instrument landing device installation as a test installation for an enlarged program of such installations at all important points and the prosecution of such final program.

3. The study of one-way ranges for expediting air traffic at congested airports under instrument approach conditions.

4. The study of personnel training programs in conjunction with Item (3) in the list agreed to be performed by the operators.

5. The sponsorship of and coordination of a research program by appropriate agencies looking to the elimination of radio static and of ice on airplanes and thereby the elimination of the fear of such, which items constitute not only a hazard in themselves but the fear of which causes a recognized mental hazard to airmen. A part of the radio static investigation should, perhaps, be along the ultra-high frequency development.

6. A study of how best to proof-test without putting into premature regular duty new and improved equipment, personnel and operating procedures. As a part of this program affecting the operating procedures we include consideration of the acceptance of not now accepted weather with the thought that it might be possible to coordinate all of the above with some means of carrying suitable first-class mail by air without passengers thereby expediting first-class mail and providing a proving ground for equipment, personnel and operating procedures without subjecting passenger traffic to such arrangements.

7. The expediting of the present programs on airports and airway aids with particular attention to the essential aids on airways now having no such aids and with attention to the modernization of airways, the intermediate fields and other facilities of which are now obsolete or inadequate for the class of equipment being operated on such airways. In view of the fact that there is a special committee on airports who will discuss methods, specifications, operation and financing with you in detail we will not itemize such matters here but desire to express the opinion that the flying equipment of civil aviation has grown faster in the past years than has ground equipment and that the single biggest help which the Authority can render to ultimate safety is an adequate solution to the ground aids problem. One of the items in this matter on which we would urge particular attention is the early completion of surveys and letting of contracts for the items authorized and intended to be included in the 1939 fiscal year appropriations.

8. The simplification of regulations should be undertaken promptly. Although the present regulations were carefully formulated and are the result of numerous conferences between the airlines and the Bureau of Air Commerce many of the provisions are in effect over the protests of operators and of airmen due to the then existing policy of having them written from a legalistic point of view. This matter is closely allied with Item (6) in the previous list of recommendations to the Authority for prompt action covering the question of basic

policy, and in our opinion it would contribute materially to the safety of operations and would be entirely consistent with the expressions by the members of the Authority of such interest in safety.

We desire to express again our appreciation of your courtesy and of the opportunity to express to you the results of the joint meeting held on Wednesday morning, September 7th. If we or our Committee can be of any assistance to you in the matter we hope you will feel free to call upon us and we are looking forward to a long, successful and happy association.

Yours very truly,

/s/ R. S. Damon
Chairman of Operations Committee
AIR TRANSPORT ASSOCIATION OF AMERICA, INC.

/s/ Fowler W. Barker
Secretary
AIR TRANSPORT ASSOCIATION OF AMERICA, INC,

Investigate the Feasibility of Consolidating all Training Activities NOW Conducted by the Civil Aeronautics Authority and the Enlargement Thereof into a Civil Aeronautic Authority Technical School.

Develop a plan of training for personnel in the Civil Aeronautics Authority and for securing and training properly qualified applicants.

Training, which is now scattered and incomplete, should be conducted on a systematic basis in such a training school under the direct jurisdiction of the Civil Aeronautics Authority.

The curriculum should at least include:

- Aeronautical Inspection Duties under CAR
- Aircraft Aerodynamics
- Aircraft Metallurgy
- Aircraft Factory Inspection
- Aircraft Inspection
- Aircraft Instrument Engineering
- Airline Inspection
- Airline Maintenance Inspection
- Airline Operations
- Airways and Airport Traffic Control
- Airways Engineering
- Airways Operations
- Communications
- Electrical Engineering
- Meteorology and Aerology
- Aviation
- Power Plant Engineering
- Structural Engineering
- Cartography
- Flight Check and Refresher Course
- Instrument Flight Training
- Administrative Paper Work

The general purpose of such training would be the proper preparation for the highly specialized work to be undertaken by the various individual assignments.

The school would be available for refresher courses by existing personnel as well as a source of training for incoming personnel.

TRANSCONTINENTAL & WESTERN AIR, INC.

Kansas City, Missouri

October 3, 1938

Subject: TWA OPERATIONS POLICY

To: ALL PERSONNEL:

With the advent of the winter season, we desire to stress the necessity of increased vigilance on the part of each and every employee toward the prevention of accidents. I believe you all realize that a single minor accident to a scheduled aircraft will definitely undermine the confidence and the trust that has been built up during the past summer and fall. A major accident or a series of minor accidents will destroy what confidence the traveling public now has in air transportation.

Safety in operations must be our very definite policy now as in the past, and my only request is that the policy be made the objective of each and every employee. The Management can only establish and adopt such a policy; it is the responsibility of our employees to see that this policy is followed and adhered to. In an organization, as highly technical and dependent upon the application of knowledge, judgment and initiative of each individual employee, as TWA has grown to be, an error in judgment or workmanship can cause a disaster. For this reason I appeal to each individual employee to be vigilant against errors or misjudgment and be proficient in the execution of his duties.

The Management will welcome a lowered operation performance thru adhering to a very conservative operating policy if the safety factor can be maintained at 100%. I assure you that no employee need fear censure for cancelling or delaying the flight, regardless of the flight advisory previously issued, if in his mind, there is any question of doubt that a flight cannot be conducted conservatively and safely to its destination. Neither will an employee be criticized or censured for failure to approve equipment or an operation if there is any hazard or doubt involved.

Let me urge that "Safety" be the motto of each of us and considered as the preamble of every order and act performed in the execution of your assigned duties. It is well to remember this -- not only your future depends upon the safety record for the coming year but the future of the air transport industry as well.

It is my sincere hope that the trust and pledge for safety first will not be violated by any employee of TWA. I know you will not fail in this trust.

/s/ Paul E. Richter
Executive Vice President.