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BY THE COMPTROLLER GENERAL

Report To The Congress

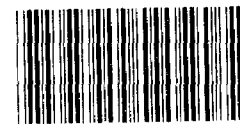
OF THE UNITED STATES

Runways At Small Airports Are Deteriorating Because Of Deferred Maintenance: Action Needed By FAA And The Congress

Runways at many small airports are deteriorating faster than necessary because airport owners--usually local governments--have deferred critical maintenance. The result is damage to the runways' basic structure and a shortened useful life if they are not repaired.

Based on GAO's review of 46 airports, studies by others, and the views of FAA officials, deferred maintenance is apparently a long-standing nationwide problem. Lack of funds is cited by airport owners as the primary reason for not performing needed maintenance; however, the Federal Aviation Administration's apathy to bring about satisfactory maintenance is a contributing cause.

GAO is recommending actions that FAA can take to help ensure that runways at small airports are properly maintained. The Congress should recognize the airport owners' lack of resources to properly maintain airports when considering future revisions to the Airport Improvement Program.



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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

The Federal Government, through the Airport Development Aid Program, invested over \$750 million in about 1,700 small airports nationwide between 1970 and 1981. We made this review to determine whether airport owners are properly maintaining runways at small airports and to aid the Congress when considering future revisions to the Airport Improvement Program. This report discusses the deterioration occurring on runways at many of these airports because owners--usually local governments--are deferring critical pavement maintenance.

Copies of this report are being sent to the Director, Office of Management and Budget; the Secretary of Transportation; the Governors of the 50 States; the owners of the airports visited; interested congressional committees and Members of Congress; and other interested parties.

A handwritten signature in cursive script that reads "Milton J. Fowler".

Acting Comptroller General
of the United States

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D I G E S T

Between 1970 and 1981, as a part of developing a national airport system for the United States under the Airport Development Aid Program, the Federal Aviation Administration (FAA) invested about \$750 million to construct and improve runways at about 1,700 of the Nation's smaller airports. As a condition of receiving Federal aid, the airport owners--usually local governments--agreed to properly maintain the airports.

GAO made this review to determine whether airport owners are properly maintaining such runways. The answer is: They are not!

RUNWAYS DETERIORATING
BECAUSE OF DEFERRED MAINTENANCE

Thirty-three of 46 small airports GAO visited in 10 States were deferring critical runway pavement maintenance. These conditions have existed in most cases for several years. Qualified FAA and State engineers accompanied GAO and inspected the runways. The 33 airports serve general aviation--generally light, single-engine, privately owned aircraft--and 16 of them also serve air carriers or commuters. The Federal Government has invested \$43 million in these 33 airports. (See pp. 5 and 6.)

In addition to GAO's review of 46 airports, discussions with FAA headquarters officials and studies of airport maintenance by other organizations indicate that the problem is nationwide. (See p. 5.)

Most cases of deferred maintenance involved the failure to repair pavement cracks promptly. The cracks varied from small cracks that covered only a portion of the runway to extensive cracks up to 6 inches deep that covered the entire runway. (See pp. 5 to 8.)

When a runway is not properly maintained, a substantial part of its useful life generally will

be lost. On the average, the inspectors estimated that about one-fourth, or about 6 years, of the useful life will be lost if the runways with deferred maintenance are not repaired. (See p. 9.)

Deferring maintenance not only causes pavement life to be lost, it also often results in serious damage to the underlying pavement structure, thus increasing rehabilitation costs. Much of this increased cost will have to be borne by the Federal Government if the runways involved are rehabilitated under any future airport improvement program. (See p. 9.)

Although poorly maintained runways can ultimately become a safety hazard, none of the runways with deferred maintenance had deteriorated to the extent that the inspectors considered them unsafe. (See p. 5.)

LACK OF FUNDS CITED FOR DEFERRING MAINTENANCE

Representatives at 29 of the 33 airports deferring maintenance said that they lacked the funds needed to perform adequate preventive maintenance. Although airports obtain some revenues from user fees, such as airplane tiedown fees and leases, 35 of the airports had to be subsidized by their owners--usually local governments. Twenty-one of the airports received over half of their annual revenues from subsidies. Officials of local governments associated with these airports stated that funds for airport maintenance are limited. (See pp. 10 and 11.)

Five of the ten States have programs to help locally owned airports meet their maintenance needs, but in four of the five States, officials advised GAO that only limited funds are available for these programs. (See p. 11.)

The shortage of funds for airport maintenance is not a new problem. A study conducted for FAA in 1974 and a study conducted by the National Association of State Aviation Officials in 1980 both identified a serious shortage of funds for airport maintenance. This later study showed an unvalidated, very rough estimate of \$144 million as the amount of priority emergency funding needed to preserve the existing airports. (See p. 11.)

FAA COULD DO MORE TO PREVENT
DEFERRED MAINTENANCE

Lack of funds was the primary reason airport representatives cited for deferring maintenance; however, FAA's failure to report poor maintenance conditions and practices during routine airport inspections and to require the owners to make timely repairs is a contributing factor. FAA inspection reports showed that maintenance was satisfactory, even though the runways were poorly maintained and the deferred maintenance conditions GAO noted apparently existed at the time of the most recent inspections. (See pp. 11 and 12.)

According to FAA regional officials in the three regions GAO visited, inspectors do not report poor maintenance conditions because finding an owner in noncompliance with its grant commitments could lead ultimately to administrative or judicial actions against such an owner. FAA headquarters and regional officials said that taking such actions would be contrary to FAA's mission of promoting civil aviation and they prefer to obtain voluntary compliance. (See p. 12.)

Airport grants represent significant Federal investments, and FAA is responsible for seeing that airports meet their commitments. Although attempting to obtain compliance with grant obligations through cooperation may be in the best interest of all concerned, GAO believes that FAA may have to, as a last resort, use administrative or judicial actions to obtain compliance. (See p. 13.)

Airport managers should benefit from better guidance on acceptable runway maintenance practices. FAA is developing, and plans to distribute, an advisory circular on airport pavement maintenance. FAA also plans to provide training on how to apply the advisory circular, if resources become available. (See pp. 13 to 15.)

RECOMMENDATIONS TO THE
SECRETARY OF TRANSPORTATION

The Secretary of Transportation should direct the Administrator, FAA, to

- complete the advisory circular on pavement maintenance and provide a copy to all airport owners, together with any necessary training on how to apply it;
- require the agency's airport inspectors to report airport owners' unsatisfactory maintenance of runways;
- require the agency's regional offices to aggressively pursue airport owners' compliance with maintenance obligations, including taking administrative or judicial action against owners who fail to satisfactorily maintain their runways; and
- require the agency's regional offices to contact aviation officials in the States that are not currently assisting small airports to see if such financial assistance can be arranged. (See pp. 14 and 15.)

AGENCY COMMENTS

The Department of Transportation concurred with GAO and plans to take the actions recommended.

MATTERS FOR CONSIDERATION BY THE CONGRESS

In considering future revisions to the Airport Improvement Program, the Congress may want to:

- Require airport owners to provide greater assurances that funds for maintenance will be available and provided when needed. Such assurances could take the form of the requirement that a trust fund or similar dedicated funding source be established by the owners or possibly the owner could be required to obtain a bond or similar guarantee that maintenance will be performed.
- Provide financial aid for maintenance at small airports.

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ABBREVIATIONS

| | |
|------|---------------------------------|
| ADAP | Airport Development Aid Program |
| DOT | Department of Transportation |
| FAA | Federal Aviation Administration |
| GAO | General Accounting Office |
| NASP | National Airport System Plan |

CHAPTER 1

INTRODUCTION

Since 1947 the Federal Government has invested billions of dollars to help develop a national system of airports for public use. It has invested funds in airports of all sizes--from small, general aviation airports, used primarily by light, single-engine aircraft, to international air carrier airports, such as Los Angeles International and O'Hare International at Chicago. The Federal Government donated hundreds of surplus military airports for public use. Through fiscal year 1981 the Federal Government has invested more than \$8 billion (including an estimated \$2.5 billion in surplus airports) in public airports.

AIRPORT DEVELOPMENT AID PROGRAM

The Airport Development Aid Program (ADAP), which was authorized by the Airport and Airway Development Act of 1970, replaced an earlier airport aid program. Under this program, the Federal Aviation Administration (FAA), Department of Transportation (DOT), makes grants for such activities as (1) constructing or improving runways, taxiways, and terminal buildings and (2) purchasing land, lighting, and navigational aids.

To be eligible for an ADAP grant, an airport must be included in the National Airport System Plan (NASP). NASP is a 10-year projection of the Nation's airport development needs. The most recent complete NASP update projected needs for 1980 through 1989. It included more than 3,600 existing and planned airports. FAA estimated that more than \$12 billion would be required for the construction, rehabilitation, and other airport development work included in the plan.

In fiscal years 1980 and 1981, the Federal share of project costs for airport development at small air carrier airports, commuter airports, and general aviation airports was limited to 90 percent. At large- and medium-size air carrier airports, the Federal share of project costs was limited to 75 percent.

Between 1970 and 1981 FAA awarded grants totaling about \$4.4 billion, including about \$2.2 billion for constructing runways and related pavements. Of the \$2.2 billion, about \$750 million was used for runways and pavements at about 1,700 of the Nation's smaller airports--small air carrier, commuter, and general aviation.

To protect its capital investment, the Government requires recipients of surplus airports and grants to maintain these airports in a safe and serviceable condition. FAA expects that airport owners will develop and implement adequate preventive maintenance programs and provide the resources needed for maintenance.

FAA has an airport compliance program which is, in part, intended to ensure that recipients of surplus airports and grants meet their maintenance obligations. Program directives require FAA personnel to determine whether owners are maintaining airports in a safe and serviceable condition and to assure that they correct unsatisfactory conditions. FAA has both administrative and judicial remedies if owners fail to satisfy airport maintenance obligations. However, FAA directives state that FAA should use administrative sanctions and judicial action to obtain compliance with maintenance obligations only as a last resort.

AIRPORT AID PROGRAM EXTENDED

Legislation authorizing ADAP expired in October 1980, but the Congress extended funding through September 1981. In 1982 the Congress enacted the Airport and Airway Improvement Act of 1982, which continues the Airport Improvement Program. The act authorizes the Secretary of Transportation to make grants for airport development and airport planning. The aggregate amount available after September 30, 1981, for such grants and for programs relating to airport noise is \$4.8 billion for the fiscal years ending before October 1, 1987.

OBJECTIVE, SCOPE, AND METHODOLOGY

We made this review so that we could inform the Congress whether airport runways developed with Federal funds are being maintained in accordance with grant agreements. In addition, information developed during this review should help the Congress structure any future airport improvement program. We made this review in accordance with generally accepted Government auditing principles.

Three FAA regions were included in our review. We selected these regions primarily because of their different climates. The FAA regions and States included in our review are shown below.

New England region

Connecticut
Maine
Massachusetts
New Hampshire
Vermont

Southwest region

Louisiana
Texas

Northwest region

Idaho
Oregon
Washington

We reviewed 46 airports (see app. I). The ADAP funds invested in each airport ranged from \$66,000 to \$3.6 million, for a total of about \$56 million.

The following table shows the type of airports by FAA region.

| | <u>New England</u> | <u>South- west</u> | <u>North- west</u> | <u>Total</u> |
|------------------|------------------------|------------------------|------------------------|--------------|
| Air carrier | 7 | 2 | 3 | 12 |
| Commuter | 5 | 2 | 3 | 10 |
| General aviation | <u>9</u> | <u>6</u> | <u>9</u> | <u>24</u> |
| Total | <u>21</u> | <u>10</u> | <u>15</u> | <u>46</u> |

Note: Air carrier and commuter airports also serve general aviation.

Twenty-seven of the airports we reviewed are owned by cities, six by States, five by counties, five jointly by cities and counties, and three by port authorities.

Our sample was based on all runway projects completed between January 1, 1970, and December 31, 1974, in the States previously identified, except in Texas. In Texas we considered only those in the southern portion. We selected projects completed during this period because the effects of deferred maintenance should be more visible on older projects. We excluded hub airports (Boston's Logan, Seattle-Tacoma, Dallas-Fort Worth, etc.) from our sample because preliminary work showed that such airports did not have serious maintenance problems. We also excluded airports where ADAP projects completed after 1974 involved overlaying pavements funded by earlier ADAP grants. We visited the 46 selected airports between November 1981 and February 1982. We also took photographs at some of the airports.

FAA provided us qualified engineers to assist in inspecting and assessing runway conditions at all airports except for the four in Idaho. In Idaho, we had an Idaho State Aeronautics Division official inspect and assess runway conditions. He is a licensed professional civil engineer, who originated and administered the State's asphalt maintenance program.

The inspectors assessed the runway conditions solely from visual inspection. The assessments did not include a laboratory analysis of runway core samples or other engineering tests. The inspectors evaluated the pavements in accordance with a January 1981 draft FAA advisory circular on pavement maintenance. They classified pavement problems as low-, medium-, or high-severity based on the draft advisory circular.

Airport representatives accompanied us during the inspections, and we discussed runway maintenance practices with them during the

inspections. We also requested financial data to learn how much money they had spent on maintenance. The data we received was not always complete, and we did not verify its accuracy.

We contacted the aeronautic division office in each of the 10 States to (1) ascertain the State's role in airport maintenance and (2) review State airport inspection reports. We discussed the prospects of future State aid for airport maintenance with officials in these offices.

At the FAA regional offices we reviewed ADAP grant files and FAA compliance inspection reports for the airports in our sample. In addition, we discussed inspection reports and inspection reporting practices with cognizant FAA officials. We compared the conditions noted in our inspection with conditions in previous FAA inspection reports. We discussed the differences and the possible reasons for the differences with FAA regional Airport Division officials.

At FAA headquarters we examined the legislative history for ADAP and we obtained information on program accomplishments. We also discussed our findings with the FAA Director of Airport Standards and his staff.

In addition, we examined studies and articles on airport and highway pavement maintenance and we interviewed knowledgeable officials of several organizations about pavement maintenance and conditions and acceptable maintenance procedures. These included officials from the National Association of State Aviation Officials, the Asphalt Institute, the Federal Highway Administration, the National Asphalt Pavement Association, and B & M Technological Services, Inc., the consulting firm that developed the data for the draft advisory circular on airport pavement maintenance.

CHAPTER 2

RUNWAYS AT SMALL AIRPORTS ARE DETERIORATING

BECAUSE OF DEFERRED MAINTENANCE

Runways that were constructed at small airports with ADAP funds are deteriorating faster than necessary because airport owners are deferring critical pavement maintenance. In addition to shortening a runway's useful life, deferring maintenance generally results in serious damage to the basic runway structure, thus increasing the cost to rehabilitate the runway. FAA's failure to report poor maintenance conditions and practices and to require correction is a contributing factor, but a lack of funds was the primary reason airport representatives cited for deferring maintenance.

We examined runway conditions at 46 small air carrier, commuter, and general aviation airports in 10 States. FAA provided us qualified engineers to assist us in inspecting and assessing runway conditions at all airports except for four in Idaho. An Idaho State Aeronautics Division official inspected and assessed the runway conditions of the four Idaho airports. The inspectors assessed the runway conditions solely from visual inspections; the assessments did not include a laboratory analysis of runway core samples or other engineering tests or analyses.

Based on our work in the 10 States, discussion of the poor maintenance conditions we found with the FAA Director of Airport Standards and his staff, and our review of other studies of airport maintenance, we believe that the problems identified are widespread.

MAINTENANCE IS BEING DEFERRED

Runways at 33, or 72 percent, of the 46 airports inspected were deteriorating unnecessarily because owners had deferred critical maintenance. The Federal Government has invested \$43 million in these 33 airports. Although poorly maintained runways can ultimately become a safety hazard, none of the runways with deferred maintenance had deteriorated to the extent that the inspectors considered them unsafe.

As used in this report, deferred maintenance generally means failure to make timely repairs to cracks or other surface defects that appear on the runway. The inspectors used the January 1981 draft FAA advisory circular on pavement maintenance as a guide for assessing pavement conditions. The consulting firm that developed the data for the advisory circular told us that failure to repair any runway surface crack one-quarter of an inch wide or more at the earliest reasonable time should be considered as deferred maintenance. The firm noted that failure to promptly repair other pavement surface problems, such as ruts or depressions, should also be considered as deferred maintenance.

The inspectors rated the severity of the conditions noted and estimated the approximate runway surface area affected. They assigned ratings of low, medium, or high severity based on criteria in the draft FAA advisory circular. 1/ For the 33 airports that had deferred maintenance, 2 had high-severity cracks and 24 had medium-severity cracks.

Conditions ranged from one-quarter-inch cracks over a portion of the runway to cracks that were up to 3 inches wide over the entire runway. We also found cracks up to 6 inches deep. In most cases deferred maintenance problems involved the entire runway surface and had existed for several years.

As the following table shows, we found that all three types of airports in our study were deferring maintenance.

Deferred Maintenance by
Type of Airport

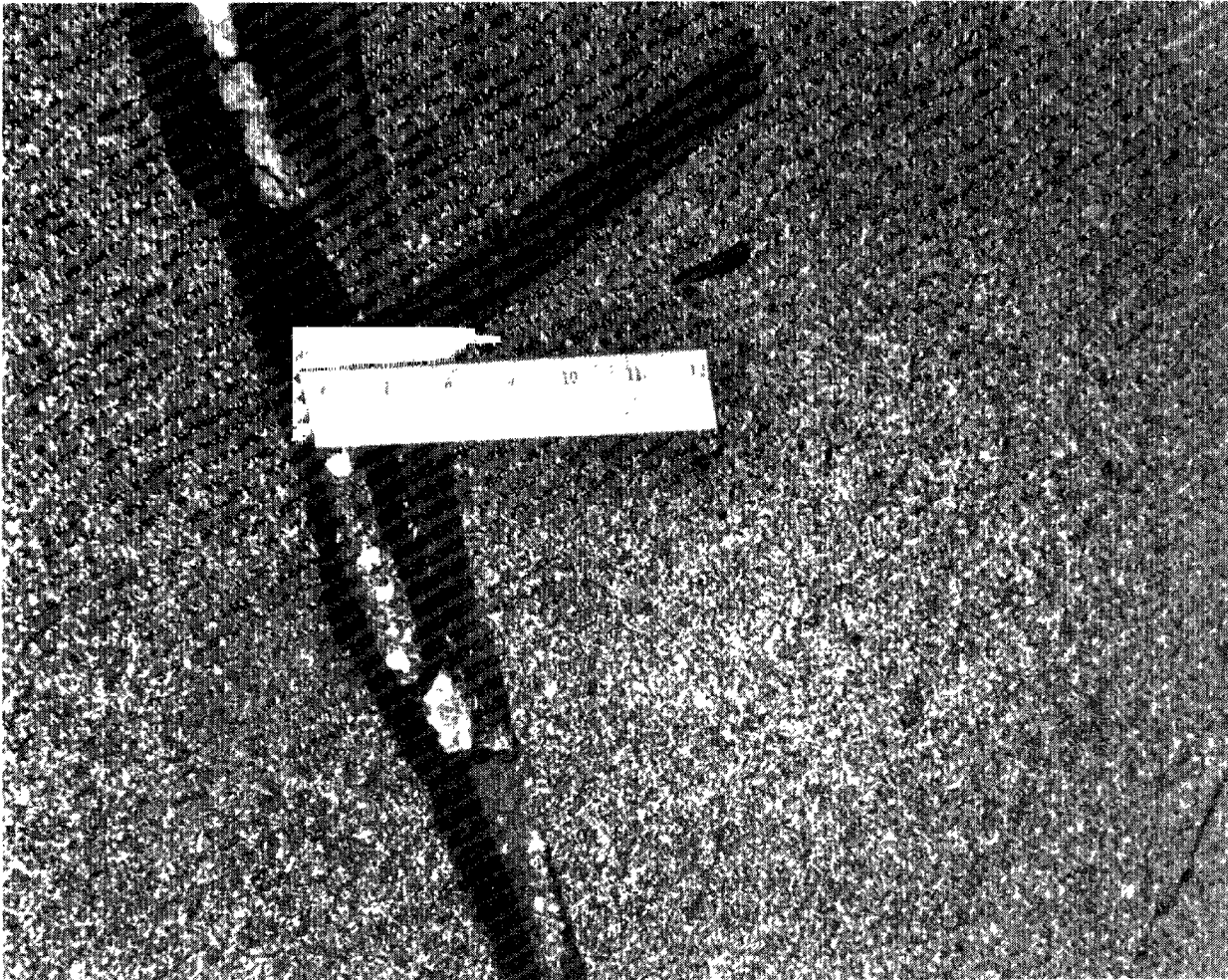
| <u>Type of airport</u> | <u>Number in sample</u> | <u>Number with deferred maintenance</u> | <u>Percent</u> |
|------------------------|-------------------------|---|----------------|
| Air carrier | 12 | 9 | 75 |
| Commuter | 10 | 7 | 70 |
| General aviation | <u>24</u> | <u>17</u> | 71 |
| Total | <u>46</u> | <u>33</u> | 72 |

Airport owners had deferred maintenance on new pavements as well as on rehabilitated pavements. We could not identify any significant differences between types of airports or FAA regions.

Following are examples of runways that have deteriorated because of deferred maintenance.

1/In general, the draft advisory circular defines a low-severity crack as having a width of one-quarter inch or less, a medium-severity crack as having a width of greater than one-quarter inch, and a high-severity crack as having loose and missing particles.

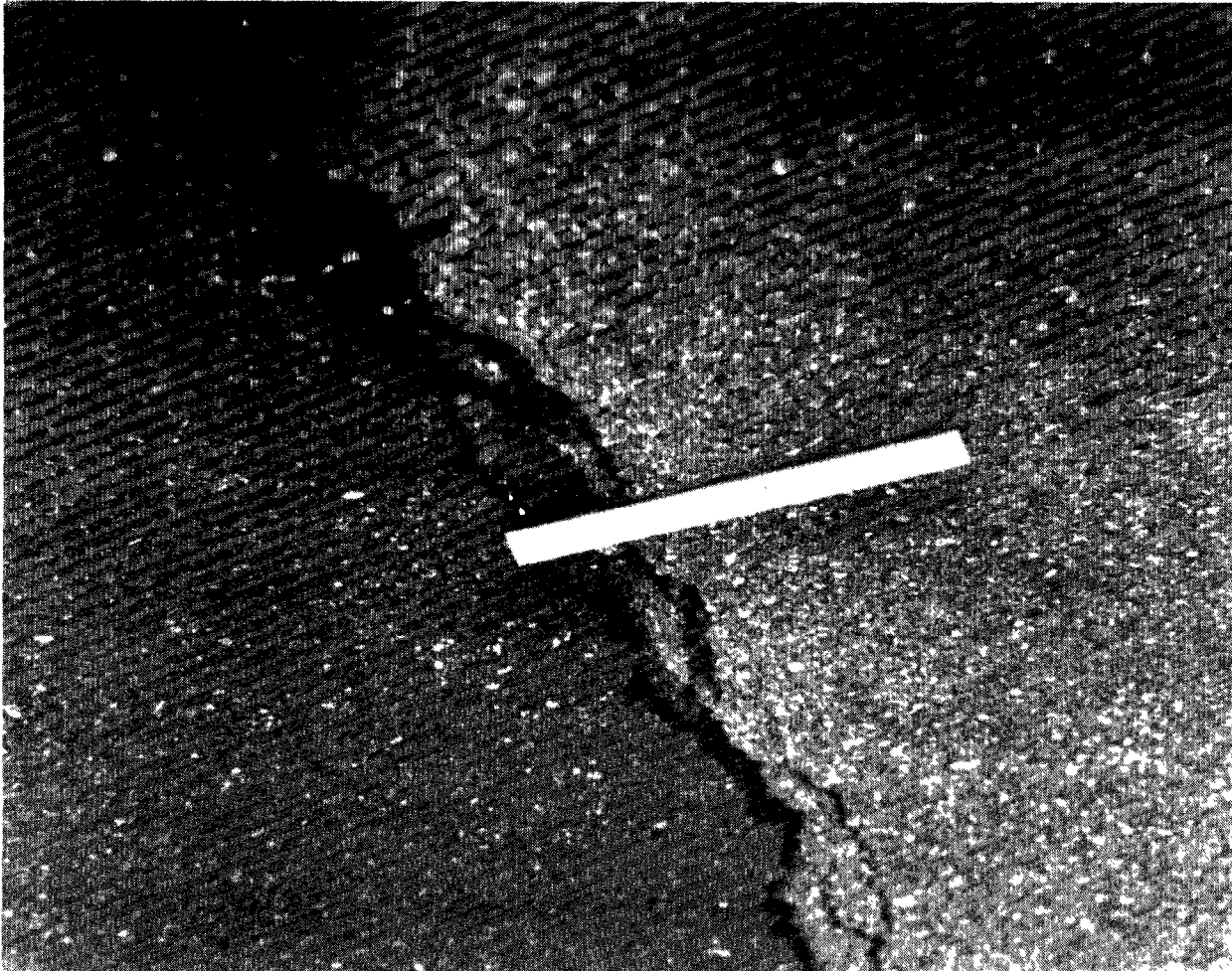
Example No. 1



Auburn, Maine (Runway 4-22)

In 1974 about half of the runway at this small air carrier airport was reconstructed and overlaid, costing about \$285,000 in ADAP funds. As of June 1981 a total of \$1.6 million in ADAP funds had been invested in this airport. In November 1981, when the airport was inspected, this portion of the runway was entirely covered with cracks up to 6 inches deep. According to the inspector, the cracks have existed for at least 2 years.

Example No. 2



Arlington, Washington (Runway 15-33)

In 1974 the entire runway at this general aviation airport was rehabilitated, costing about \$100,000 in ADAP funds. As of June 1981 a total of \$200,000 in ADAP funds had been invested in this airport. In December 1981, when the airport was inspected, cracks up to 3 inches wide were over the entire runway. The airport superintendent of maintenance stated that the cracks had existed for at least 2 years.

Deferred maintenance
accelerates deterioration

One consequence of deferring maintenance is that pavement deterioration accelerates. This fact has been established by several highway pavement studies. For example, in a recent article the Asphalt Institute stated that pavement structures may undergo accelerating rates of deterioration as defects go uncorrected and that proper maintenance and rehabilitation will significantly lengthen the life of a pavement system. 1/ In 1979 we reported that deferred maintenance is one reason why highways deteriorate, pointing out that proper and timely maintenance can slow highway deterioration. 2/

We did not find any specific studies of how deferred maintenance affects airport runway pavements. However, an FAA budget document states that an effective maintenance program will substantially extend airport pavement life. Also, officials of the Asphalt Institute and the Federal Highway Administration agree that the structural design of airport pavements and highways are sufficiently similar that the effect of deferred maintenance would be the same for airports as highways.

The inspectors concluded that if the owners of the 33 airports that have deferred maintenance continue to postpone maintenance, the useful life of the runways could be greatly shortened. The inspectors estimated that continued deferred maintenance would shorten the runway lives on the average by about 24 percent, or about 6 years.

Deferred maintenance increases
rehabilitation costs

Deferred maintenance not only causes pavements to deteriorate at an accelerated rate, but it also generally results in serious damage to the underlying pavement structure, thus increasing rehabilitation costs. Much of this increased cost will have to be borne by the Federal Government if the runways involved are rehabilitated under a future airport development aid program.

The January 1981 draft FAA advisory circular on pavement maintenance states that almost immediately after construction, airport pavements begin a gradual deterioration due to such factors as surface weathering and movement in the underlying subbase.

1/The Asphalt Institute, "Alternatives In Pavement Maintenance, Rehabilitation, And Reconstruction," May 1980.

2/"Excessive Truck Weight: An Excessive Burden We Can No Longer Support," (CED-79-94, July 16, 1979).

If routine maintenance is not performed during the early stages of deterioration, extensive repairs will be required later, when cracks and other pavement defects progress into major failures. For example, when cracks become wide and deep enough to allow water to enter the pavement base, the base materials are subject to failure. Greater cracking and pieces of asphalt breaking away from the pavement may require airports to remove and replace the pavement.

Various studies have concluded that deferring maintenance will lead to higher repair costs. For example, our 1981 report on deteriorating highways 1/ pointed out that deferring maintenance is costly because as time passes more intensive repairs are needed as the pavement continues to deteriorate. In addition, a 1981 Asphalt Institute report 2/ stated that deferred maintenance represents an added cost. The report concluded that the accumulated cost of repair due to deferred maintenance increases geometrically over time. The Airport Services Management periodical 3/ also pointed out that proper preventive maintenance will substantially reduce the need for extensive repairs and replacement of deteriorating airport surfaces. Similarly, an FAA budget document states that an effective maintenance program will substantially minimize rehabilitation and replacement costs of airport pavement.

LACK OF FUNDS IS THE REASON MOST OFTEN
CITED FOR DEFERRING MAINTENANCE

Representatives at 29 of the airports deferring maintenance said that they lacked the funds needed for an adequate maintenance program.

Most airports are not self-supporting

Most airports were not self-supporting and required operating and maintenance subsidies from the owner. In varying degrees, 35 of the 46 airports visited depended on subsidies to supplement funds collected from airport users, such as airplane tiedown fees and leases. Information provided by these airports shows that 21 received at least half of their total annual revenues from subsidies.

We were unable to evaluate the adequacy of airport representatives' attempts to obtain additional subsidies to meet

1/"Deteriorating Highways And Lagging Revenues: A Need To Reassess The Federal Highway Program," (CED 81-42, Mar. 5, 1981).

2/The Asphalt Institute, "Alternatives In Pavement Maintenance, Rehabilitation, And Reconstruction," May 1981.

3/Airport Services Management, Aug. 1976.

maintenance needs. We requested evidence from airport representatives of the attempts to obtain more operating and maintenance funds from nonuser sources; however, the information made available was generally insufficient to permit an evaluation. In some cases, the amount of funds requested for maintenance could not be ascertained from available records. In other cases, the actual amount made available for maintenance could not be determined because local or State government maintenance crews performed the maintenance without charge.

State funds to help locally owned airports pay for runway maintenance are limited. For example, only 5 of the 10 States we visited had programs to assist locally owned airports to meet their maintenance needs. State officials in four of the five States said that funds for these programs are limited. State officials agreed that inadequate funds have contributed to deferred maintenance at locally owned airports.

Lack of maintenance funds
is not a new problem

Lack of funds for pavement maintenance is a longstanding problem. In 1974 DOT contracted for an analysis of general aviation airports developed with Federal financial aid. The contractor reported that few of the airports inspected had performed maintenance to protect or extend runway life. The contractor observed that most general aviation airports are owned by small municipalities, which do not have funds available to maintain runways. In 1980 the National Association of State Aviation Officials expressed concern over runway deterioration at a large number of the Nation's public-use airports. Based on a survey of its members, the association concluded that a need exists for priority emergency funding to preserve the existing public-use airport capacity. The survey showed an unvalidated, very rough estimate of such needs to be about \$74 million for general aviation airports and about \$70 million for air carrier, commuter, and reliever 1/ airports.

FAA COULD DO MORE TO PREVENT
DEFERRED MAINTENANCE

Although lack of funds was the primary reason that airport representatives cited for deferring maintenance, FAA's failure to report unsatisfactory maintenance conditions and practices and to require the owners to correct them is a contributing factor.

Generally, grantees (owners) are required to carry out a continuing program of preventive maintenance and minor repairs to ensure that the airport facilities are in a good and serviceable

1/A reliever airport is a general aviation airport having the primary function of relieving congestion at an air carrier airport by diverting from that airport general aviation traffic.

condition at all times. FAA has a program intended to ensure that grantees comply with these grant obligations. FAA's policy regarding the compliance program is to obtain, to the extent possible, airport owners' voluntary cooperation to adhere to their obligations. However, remedies available to effect compliance include legal actions and administrative actions. Administrative actions include refusing to grant additional funds and suspending or canceling projects that benefit the airport owner. According to FAA, grant agreements are valid contracts with the Government; therefore, legal remedies for breach of contract are available to FAA when grantees fail to meet their maintenance obligations.

FAA inspectors do not report
unsatisfactory maintenance conditions

FAA inspectors do not always report pavement maintenance problems even though one objective of FAA's compliance program is to ensure that public airports are properly maintained. Cognizant FAA officials in all regions we visited agreed that some airport owners are deferring runway maintenance.

Our review of FAA's inspection reports shows that FAA has placed little emphasis on pavement maintenance. We reviewed available FAA inspection reports for each airport where we observed deferred maintenance. The inspection reports showed that maintenance was satisfactory at 31 of 33 1/ airports even though the deferred maintenance conditions we noted apparently existed at the time of the most recent FAA inspections. For example, one airport had cracks up to 3 inches wide over the entire runway; the owner stated that these cracks had existed for longer than 2 years. However, the report of the latest FAA inspection--made only 4 months before ours--stated that maintenance was acceptable. At another airport the runway had cracks up to 3 inches wide at regular intervals over the entire surface. According to the airport representative, these cracks have existed since about 1977. However, FAA's most recent inspection report in November 1981 did not mention the pavement defects and stated that maintenance was satisfactory.

Perhaps the most important reason FAA inspectors do not report unsatisfactory maintenance conditions is the general reluctance of FAA officials to enforce grant obligation compliance through administrative or judicial actions. FAA headquarters and regional officials responsible for airport programs said that such action is contrary to FAA's mission of promoting civil aviation. They said that they should work with the owners to administer the grants in a manner that will be in the best interests of civil aviation and that instigating action to force compliance would

1/FAA inspection reports were not found for one airport and the report for the other commented on inadequate maintenance.

be contrary to this objective. They said that the best results are obtained by constantly working with owners to obtain voluntary compliance.

An FAA order states that the goal of the compliance program is to be achieved primarily by persuasion and education, rather than by using administrative and judicial action. However, the order also states that FAA must take positive action to improve those airports which are not being operated or maintained as required. The order further states that although enforcement procedures may seem detrimental to the overall objectives of a national airport system, not to seek sanctions against airports known to be violating their agreements would be contrary to FAA's trust. FAA headquarters officials advised us that FAA has never sought to achieve compliance with the maintenance provisions of airport grant agreements through judicial action. FAA regional officials told us that they were not aware of any instance where FAA has used its administrative remedies to persuade an airport owner to perform satisfactory maintenance.

We agree that to obtain compliance with grant obligations through cooperation and mutual agreement would be in the best interest of all concerned. But, airport development grants are made in exchange for binding commitments designed to assure that the public's, as well as civil aviation's, interests are served. These are valuable rights obtained for the public at a substantial cost in direct grant funds, and FAA is responsible for seeing that airport owners meet their commitments. Therefore, we believe that FAA has no alternative but to ensure that airports developed with Federal funds are properly maintained, even though this may require using distasteful administrative and/or judicial actions.

Airport managers need better guidance on pavement maintenance

Many airport managers have limited experience with pavement maintenance. Several airports we inspected were managed by city mayors or other absentee managers, who acknowledged to us that they have had little if any training or experience in pavement maintenance. Other airports were managed by owners or managers of businesses operating on airport property, and they also lacked experience with airport pavement maintenance. Some airports are managed by full- or part-time resident managers; however, some of these managers also have had limited experience with pavement maintenance.

Practices of airport managers show a need for guidance in pavement maintenance techniques. While some airport managers attempted to perform runway maintenance, their methods of cleaning, filling, and sealing pavement cracks were improper and ineffective. In addition, some airport runways were damaged during snow removal. We observed instances of pavement cracking that had progressed to the point that corrective maintenance was needed; however, the airport managers did not recognize the need for maintenance.

Actions that FAA has taken or is planning to take should improve this situation. FAA is preparing an advisory circular that provides guidance on how to identify and assess pavement maintenance problems and on when maintenance should be performed. The circular will also give specific instructions on how to perform the more common maintenance procedures. FAA has recognized the need for training airport officials in how to maintain airport pavements. FAA headquarters officials who are responsible for airport maintenance said that they plan to have a training program in conjunction with distributing the advisory circular on airport pavement maintenance.

CONCLUSIONS

Critical runway maintenance is being deferred at small airports. As a result, the useful life of the runways--which represent a substantial Federal investment--will be shortened and the basic runway structures will be damaged if the runways are not repaired. Although a lack of funds was the primary reason cited for deferring maintenance, FAA's lack of aggressive action to bring about proper maintenance is a contributing cause.

Although FAA is authorized to use administrative sanctions and judicial actions in pursuing compliance with grant obligations, it has not done so. FAA prefers to secure voluntary compliance. Our review shows that this practice is not working.

The proposed FAA advisory circular on airport pavement maintenance should help to inform airport owners about acceptable maintenance programs and practices and help them to identify conditions that need maintenance. The planned pavement maintenance training program should also be beneficial.

The limited funds available at State and local levels to maintain runways at small airports is a longstanding problem. Thus to provide a system of well-maintained small airports, the Congress may have to take action.

RECOMMENDATIONS TO THE SECRETARY OF TRANSPORTATION

We recommend that the Secretary of Transportation direct the Administrator, FAA, to

- complete the advisory circular on pavement maintenance and provide a copy to all airport owners, together with any necessary training on how to apply it;
- require the agency's airport inspectors to report airport owners' unsatisfactory maintenance of runways;
- require the agency's regional offices to aggressively pursue airport owners' compliance with maintenance obligations, including taking administrative or judicial

actions against owners who fail to satisfactorily maintain their runways; and

--require the agency's regional offices to contact aviation officials in the States that are not currently assisting small airports to see if such financial assistance can be arranged.

AGENCY COMMENTS AND OUR EVALUATION

In commenting on our proposed report by letter dated August 11, 1982 (see app. II), DOT concurred with our recommendations. We were advised that the advisory circular on pavement maintenance was in the final stages of coordination and that it should be published and distributed to airport owners by October 1, 1982. FAA plans to conduct a training program covering the maintenance of pavements at small airports, if resources are available. FAA plans to reemphasize to its regional officials the requirement that inspectors should bring unsatisfactory maintenance conditions of runways to the attention of the airport operator for appropriate corrective action.

FAA plans to urge its regional offices to give added emphasis, within existing resources, to runway maintenance when conducting compliance inspections at small airports. FAA plans to require its regional offices to contact aviation officials in the States that are currently providing financial assistance to small airports to see if State assistance can be arranged.

These planned actions are in accord with our recommendations. If the actions are fully implemented, they should help reduce the unnecessary deterioration of runways at federally aided small airports.

MATTERS FOR CONSIDERATION BY THE CONGRESS

When considering future revisions to the Airport Improvement Program, the Congress should recognize that many owners of small airports lack the resources to properly maintain their runways. If grants are to continue to be made to airport owners that may lack the resources to maintain the airports, it appears that the Congress may have to authorize Federal aid to assure proper maintenance.

Another approach the Congress could take would be to require that grantees provide greater assurances that maintenance funds will be available and provided when appropriate. Such assurance could take the form of a requirement that a trust fund or similar dedicated funding source be established by the owner or possibly the owner could be required to obtain a bond or similar guarantee that maintenance will be performed. These requirements could limit the number of airports that will be able to qualify for Federal aid and thus reduce the number of airports in the national airport system.

LIST OF AIRPORTS IN OUR REVIEW

| <u>Name and location of airport</u> | <u>ADAP investment in airport to June 1981</u> |
|---|--|
| New England region: | |
| *1. Igor I. Sikorsky Memorial Bridgeport, Connecticut | \$ 3,613,946 |
| *2. Danbury Municipal Danbury, Connecticut | 1,119,083 |
| 3. Groton-New London Groton, Connecticut | 1,585,678 |
| 4. Tweed-New Haven New Haven, Connecticut | 2,030,689 |
| 5. Waterbury-Oxford Oxford, Connecticut | 1,350,919 |
| *6. Auburn-Lewiston Municipal Auburn, Maine | 1,618,863 |
| *7. Augusta State Augusta, Maine | 3,006,767 |
| *8. Biddeford Municipal Biddeford, Maine | 174,891 |
| 9. Lincoln Regional Lincoln, Maine | 403,234 |
| *10. Machias Valley Machias, Maine | 98,910 |
| 11. Oxford County Regional Norway, Maine | 364,529 |
| *12. Rangeley Municipal Rangeley, Maine | 121,801 |
| *13. Knox County Regional Rockland, Maine | 1,012,572 |
| *14. Waterville Robert Lafleur Waterville, Maine | 957,132 |
| *15. Martha's Vineyard Vineyard Haven, Massachusetts | 1,937,614 |
| *16. Nantucket Memorial Nantucket, Massachusetts | 2,576,201 |
| *17. Orange Municipal Orange, Massachusetts | 77,986 |
| 18. Provincetown Municipal Provincetown, Massachusetts | 456,190 |
| *19. Concord Municipal Concord, New Hampshire | 540,264 |
| *20. Lebanon Municipal Lebanon, New Hampshire | 2,121,470 |
| *21. Rutland State Rutland, Vermont | 690,486 |

*The asterisk indicates that the airport deferred maintenance.

| <u>Name and location of airport</u> | <u>ADAP investment in airport to June 1981</u> |
|--|--|
| Northwest region: | |
| *22. Burley Municipal Burley, Idaho | \$ 446,447 |
| *23. Fanning Field Idaho Falls, Idaho | 3,492,753 |
| *24. Mountain Home Municipal Mountain Home, Idaho | 208,733 |
| 25. Twin Falls Sun-Valley Regional Twin Falls, Idaho | 2,317,960 |
| 26. Lake County-Lakeview Lakeview, Oregon | 254,597 |
| 27. Lebanon State Lebanon, Oregon | 379,959 |
| *28. Pendleton Municipal Pendleton, Oregon | 2,598,658 |
| *29. Anacortes Anacortes, Washington | 260,386 |
| *30. Arlington Municipal Arlington, Washington | 202,995 |
| *31. Bellingham International Bellingham, Washington | 2,042,588 |
| 32. Kitsap County Bremerton, Washington | 2,186,980 |
| *33. Omak Omak, Washington | 219,822 |
| 34. Pullman-Moscow Regional Pullman, Washington | 573,414 |
| *35. Boeing Field-King County International Seattle, Washington | 3,541,020 |
| *36. Felts Field Spokane, Washington | 405,418 |
| Southwest region | |
| *37. Homer Municipal Homer, Louisiana | 91,016 |
| *38. Monroe Municipal Monroe, Louisiana | 5,113,472 |
| *39. Alice International Alice, Texas | 193,100 |
| *40. Brownsville International Brownsville, Texas | 3,438,790 |
| *41. Easterwood Field College Station, Texas | 691,118 |
| *42. Cotulla Municipal Cotulla, Texas | 110,418 |
| 43. Orange County Orange, Texas | 317,647 |
| 44. Aransas County Rockport, Texas | 453,202 |

APPENDIX I

APPENDIX I

| <u>Name and location of airport</u> | <u>ADAP investment in airport to June 1981</u> |
|---|--|
| *45. Draughon-Miller Municipal Temple, Texas | \$ 646,077 |
| *46. Garner Field Uvalde, Texas | <u>65,966</u> |
| Total | <u>\$56,111,761</u> |



U.S. Department of
Transportation

Assistant Secretary
for Administration

400 Seventh St., S.W.
Washington, D.C. 20590

AUG 11 1982

Mr. Henry Eschwege
Director, Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

We have enclosed two copies of the Department of Transportation's (DOT) reply to the General Accounting Office (GAO) draft report, "Runways at Small Airports are Deteriorating Because of Deferred Maintenance: Action Needed by FAA and Congress," dated June 15, 1982.

The report states that runways constructed at small airports with Airport Development Aid Program (ADAP) funds are deteriorating faster than necessary because airport owners are deferring critical pavement maintenance. This shortens a runway's useful life and generally results in serious damage to the basic runway structure, thus increasing the cost of rehabilitating the runway. While a lack of funds was the principal reason cited by airport representatives for deferring maintenance, GAO reports that the Federal Aviation Administration's (FAA) failure to report and require corrections on poor maintenance conditions and practices, was also a contributing factor. The gist of GAO's recommendation was that FAA provide an advisory circular on airport maintenance to all airport owners and take a more active role in monitoring the maintenance of runways. This would include the use of administrative and judicial measures against airport sponsors who fail to satisfactorily maintain their runways. GAO also recommends that those states not presently assisting small airports be contacted by Agency regional offices to see if such assistance can be arranged.

The Department concurs with the GAO recommendations and the thrust of the report. Some of the recommendations made by GAO are either underway or in place. For instance, the draft advisory circular on pavement maintenance is in the final stages of coordination and should be published and distributed by October 1. With respect to compliance, while procedures for administrative actions are presently in place, further emphasis will be placed on runway maintenance in the conduct of compliance inspections. In

conclusion, it is the Department's intent to ensure that maintenance of small airport runways is closely monitored and that information necessary to conduct adequate maintenance programs is provided to airport owners.

If we can further assist you, please let us know.

Sincerely,

Karen S. Lee
for Robert L. Fairman

Enclosures

DEPARTMENT OF TRANSPORTATION REPLY
TO
GAO DRAFT REPORT OF JUNE 15, 1982
ON
RUNWAYS AT SMALL AIRPORTS ARE DETERIORATING
BECAUSE OF DEFERRED MAINTENANCE: ACTION
NEEDED BY FAA AND CONGRESS

SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

As a part of developing a national airport system for the United States under the Airport Development Aid Program (ADAP) between 1970 and 1981, the Federal Aviation Administration (FAA) invested about \$750 million to construct and improve runways at about 1,700 of the Nation's smaller airports. As a condition of receiving Federal aid, the airport owners--normally local governments--agreed to properly maintain the airports.

GAO conducted this review to determine whether airport owners are properly maintaining such runways.

The report states that: (1) runways that were constructed at small airports with ADAP funds are deteriorating faster than necessary because airport owners are deferring critical pavement maintenance; (2) in addition to shortening a runway's useful life, deferring maintenance generally results in serious damage to the basic runway structure, thus increasing the cost to rehabilitate the runway; and (3) a lack of funds was the primary reason airport representatives cited for deferring maintenance, but FAA's failure to report poor maintenance conditions and practices and to require correction is a contributing factor.

The GAO recommends that the Secretary of Transportation direct the FAA Administrator to: (1) complete the advisory circular on pavement maintenance and provide a copy to all airport owners, together with any necessary training on how to apply it; (2) require the agency's airport inspectors to report airport sponsors' unsatisfactory maintenance of runways; (3) require the agency's regional offices to aggressively pursue airport sponsors' compliance with maintenance obligations, including taking administrative or judicial action against sponsors who fail to satisfactorily maintain their runways; and (4) require the agency's regional offices to contact aviation officials in the states that are not currently assisting small airports to see if such assistance can be arranged.

The GAO believes that the Congress should consider whether the Federal Government should continue to provide grants to airport owners that may lack the resources to properly maintain the airports. GAO also believes that Congress could require grantees to provide greater assurances that maintenance funds will be available and provided when appropriate by some form of trust fund or similar dedicated funding source established by a grantee. Another alternative identified by GAO is for the Congress to provide financial aid for maintenance at small airports.

POSITION STATEMENT

The Department concurs with the four GAO recommendations to the Secretary. We also concur in GAO's statement that failure to provide appropriate routine maintenance can reduce the effective life of the pavement and can increase cost of reconstruction, although this is not always the case. For instance, some of the airport pavements are not deteriorating significantly although cracks do exist. Routinely filling these cracks may not therefore be cost-effective. This demonstrates the difficulty in forecasting the effect of "inadequate" maintenance.

The photo caption on page 8 relating to Idaho Falls Runway 16/34 is quite misleading. Most of the \$494,000 cost indicated was used to reconstruct the principal runway which is used by air carrier and larger general aviation aircraft. The subject runway is a 1940 era runway which had become severely cracked. It is a secondary runway but gets considerable use by general aviation aircraft. To correct the cracking problem, it will be necessary to completely reconstruct the runway surface. The work done in 1973 was a minimum cost overlay which was intended to improve the surface but not restore it to new condition. It was recognized as a stop-gap measure at that time. It was understood that the underlying cracks on 16/34 would reflect through the overlay. As noted in the report, the cracks are extensive and some are large. The principal use of the runway is by small aircraft and the climatic conditions are very dry. Therefore, the existence of open cracks is not causing significant further deterioration of the basic pavement structure. Periodic inspections of the pavement confirm this. Because of this, a continuing crack-filling program would have little benefit. A better course of action is to save that money toward a reconstruction project. For these reasons, the inspector noted that maintenance was acceptable notwithstanding the extensive cracks.

[GAO COMMENT: We found no corroborating comments in the FAA files, nor were we told by FAA or airport officials at the time of the inspection that deferred maintenance of runway 16/34 at Idaho Falls was planned and agreed to by FAA. To the contrary, the airport manager told us that maintenance of runway 16/34 was deferred because of lack of funds. However, since runway 16/34 is the secondary runway at Idaho Falls, we have replaced the Idaho Falls example with an example of deferred maintenance of the primary runway at Arlington, Washington. (See p. 8.)]

Our specific comments on the report's recommendations follow:

1. Recommendation 1. The draft advisory circular on pavement maintenance is in the final stages of coordination and should be published and distributed to airport owners by October 1. If resources become available in the future, the FAA plans to conduct a training program covering the maintenance of pavements at small airports. The course would be based on the pending circular.

To assure that small airports receive the information necessary to conduct adequate maintenance programs, FAA is beginning a special project to contact small airport operators directly. This program should be underway in the New England and Eastern Regions before the end of the fiscal year. Regions will also be encouraged to fully utilize the Compliance Program as a continuing means for assisting airport operators in addressing maintenance problems.

2. Recommendation 2. Published guidelines for FAA inspectors require that they bring unsatisfactory maintenance conditions of runways to the attention of the airport operator for appropriate corrective action. FAA will reemphasize this requirement for all regional offices.

The FAA headquarters' staff is developing automated systems to track airport inspections and to provide management with the information necessary for the more efficient allocation of inspection resources.

3. Recommendation 3. FAA certification inspectors take administrative action by issuing "Letters of Correction" at 500-700 air carrier airports each year, some of which lead to judicial actions. Small airports are subject to Compliance Inspections. FAA will urge its regional offices to give added emphasis, within existing resources, to runway maintenance in the conduct of these inspections. Procedures are already in place for such action.
4. Recommendation 4. The FAA will request that its regional offices contact aviation officials in the states that are not currently providing financial assistance to small airports to see if state or local assistance can be arranged. In this connection, the agency will point out the resultant increase in rehabilitation costs when maintenance is deferred.

Finally, if and when Congress approves, authorizes, and appropriates funds and revenues as requested by the Administration, the deficiencies identified can be pursued more aggressively.

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