



UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

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COMMUNITY AND ECONOMIC
DEVELOPMENT DIVISION

OCT 31 1979

Mr. Karl S. Bowers, Administrator
Federal Highway Administration
Department of Transportation *AGC0003*



Dear Mr. Bowers:

10 We have completed our *[*survey of the Interstate Resurfacing, Restoration, and Rehabilitation ~~(RRR)~~ program *]* which provides the States with Federal funding to assist them in preserving their existing interstate highways. We are not planning any additional audit work on the program at this time; however, we did note two matters in the program's operation which we believe should be brought to your attention:

- Further guidance may be necessary for determining whether regular interstate funds or interstate RRR funds should be used for friction courses.
- The criteria for approving overlays are general and do not ensure that the overlays are the most cost effective.

In addition to our work at the Federal Highway Administration (FHWA) headquarters office, we visited FHWA division offices and State highway offices in Massachusetts, Connecticut, and Rhode Island. We also contacted FHWA regional offices in New York and Colorado. Details of our observations and recommendations are presented below.

FUNDING OF FRICTION COURSES

Our discussions with FHWA field officials concerning various circumstances under which overlays to improve the skid resistance of the highway surface (friction courses) might be constructed indicated that under similar circumstances their decisions to use regular interstate funds or interstate RRR funds varied. Because of the different Federal participation rates for the two sources of funding--90 percent for regular interstate funding and 75

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percent for interstate RRR funding--the varying opinions as to the source of funding could cause inequities among the States.

FHWA guidelines issued in November 1978 encourage the States to use open-graded asphalt friction courses to improve the skid resistance of their highway surfaces.

Rhode Island and Connecticut used friction courses on their interstate highways but funded them differently. Rhode Island used regular interstate funds because the friction courses were to improve the safety of its roads which had low skid resistance. Connecticut generally used interstate RRR funds and applied the friction course as the top layer of an overlay which was intended to improve the riding surface of the highway. Connecticut officials said that interstate RRR funds had to be used for the friction courses because the existing surfaces did not have a skid problem.

FHWA headquarters officials said that in both cases the proper funds were used. They said that regular interstate funds may be used for a friction course if it is to correct a bona fide safety problem. Interstate RRR funds, according to these officials, should be used if the road has adequate skid resistance but must be overlaid for other reasons and a friction course is used as the top layer.

However, our discussions with various FHWA field officials on how friction courses should be funded in various situations indicated differences of opinion existing among regions, among divisions in the same region, and among divisions and their cognizant regional officials.

One official thought that regular interstate funds could be used only when there was a demonstrated safety problem. However, he was not sure they could be used even then if the friction course was put down as the wearing surface of an RRR-funded overlay. An FHWA official in another State, after consultation with another FHWA official, said that a friction course would not be eligible for regular interstate funding if the road has a structural problem. If a structural problem exists, RRR funds must be used.

To further clarify our understanding of the field officials' perceptions of FHWA policy, we described several hypothetical situations for proposed friction courses on the interstate system. We asked several FHWA officials what type of funds they would consider appropriate in each situation. Their responses, consistent in some situations, varied in others, are shown in the appendix.

The FHWA officials agreed that regular interstate funds could be used for a friction course when the pavement's problem is inadequate skid resistance alone or with surface cracks and ruts.

Two officials believed that when the pavement has inadequate strength in addition to poor skid resistance and surface cracks and ruts, interstate RRR funds could be used for the friction course. Two others believed that while interstate RRR funds could be used, regular interstate funds could also be used for the friction course.

Opinion was even more varied regarding a friction course on an interstate with adequate skid resistance and adequate strength but with surface cracks and ruts. Some officials said the project might not be funded at all; one said regular interstate funds might be justified; and one said interstate RRR funds should be used.

Conclusions and recommendation

Under similar circumstances, FHWA field officials expressed varying opinions on whether regular interstate or interstate RRR funds could be used for friction courses. These varying opinions could result in inequities to the States because of the different Federal participation rates. Accordingly, we recommend that FHWA consider whether further guidance is necessary to ensure funding uniformity for friction courses applied under similar circumstances.

NO ASSURANCES THAT OVERLAYS ARE COST EFFECTIVE

In 1977, a Department of Transportation report estimated the backlog of needed RRR work on the interstate at

\$2.6 billion and annual needs thereafter of about \$950 million based on the 1975 purchasing power of the dollar. Much of the RRR work being done on the interstate highways in the three States we surveyed involved putting down overlays to improve the strength and/or rideability and safety of the highway. FHWA guidelines, however, are very general with respect to criteria for determining the overlay thickness or how long it should last; consequently, the guidelines do not ensure that the overlays are the most cost effective.

The guidelines state that overlays should provide additional strength or improve serviceability for a substantial time period but do not indicate what this time period should be. Further, they provide that pavement design may be based upon State procedures and practices that past performance has proved satisfactory. According to these guidelines, FHWA will use the American Association of State Highway and Transportation Officials (AASHTO) Interim Guide for Design of Pavement Structures as a guide when evaluating the adequacy of a State's proposed design.

FHWA division and State officials believe that knowledge of overlay design is insufficient at this time to determine the most cost-effective or optimum overlay thicknesses. As one official explained, pavement designers must rely on AASHTO guidelines and their own experience until technical advances are made.

With respect to determining design life, an FHWA research official noted that no one design life would be best for all roads. For example, he said that because of the inconvenience and costs of construction on high-volume roads, a very long design life would be best, while something much less might be better on a lightly traveled road.

FHWA research officials told us that progress is being made in the area of pavement design, but the States are reluctant to apply research findings. In addition to a normal resistance to change, they want to be sure that a new process will work under their particular climatic and geological conditions. They also want assurance that the results will be long lasting, but it could take many years to determine this. A headquarters official said

that FHWA does not have enough confidence in the researchers' new design techniques to require the States to use them. An FHWA official also commented that while the interstate highways are designed to be structurally adequate to accommodate traffic for 20 years, they usually have to be resurfaced more frequently to maintain a smooth ride.

FHWA officials said that funding is another obstacle to requiring the most cost-effective RRR alternative, assuming it could be determined. They indicated that the initial cost of optimum overlays could require increased Federal funds. As one official explained, some States, in order to make available funds go as far as possible, are putting down overlays that might well be thinner than the most cost effective would be.

Conclusions and recommendation

FHWA guidelines for constructing overlays do not ensure that overlays are the most cost effective. While FHWA indicates a lack of expertise in this area, the States have extensive experience with overlays and this could be drawn on to develop program guidelines. Considering the Federal Government's contribution of 75 percent to overlay costs under the RRR program and the significant future needs of this program, we believe that FHWA must provide guidance with respect to the cost effectiveness of such overlays. Roads are generally constructed to enable them to accommodate the types and volumes of traffic anticipated for a specified time, such as the 20-year design life for interstate highways. However, they generally have to be resurfaced more frequently to maintain a smooth-riding surface. Therefore, it would seem that some criteria, giving consideration to the design life and the anticipated surface life of the road, could be developed for overlays.

Accordingly, we recommend that FHWA develop criteria, giving consideration to such items as initial and recurring costs, desired structural life, and anticipated surface life, to ensure that the overlays constructed under this program are the most cost effective.

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Because of our continuing interest in the program, we would appreciate being advised within 30 days of any action taken or planned on our recommendations. We appreciate the cooperation and courtesies extended by the FHWA staff during this survey.

Sincerely yours,


J. Kevin Donohue
Group Director

APPENDIX

FHWA OFFICIALS' VIEWS ON TYPE OF FUNDS
CONSIDERED APPROPRIATE FOR THE FRICTION COURSE

<u>HYPOTHETICAL SITUATION</u>					
<u>PAVEMENT CONDITION</u>	<u>PROPOSED OVERLAY</u>	<u>RESPONSE #1</u>	<u>RESPONSE #2^{1/}</u>	<u>RESPONSE #3</u>	<u>RESPONSE #4</u>
Low skid numbers; smooth surface	Open-graded friction course	REGULAR INTER- STATE	REGULAR INTER- STATE	REGULAR INTER- STATE	REGULAR INTER- STATE
Low skid numbers; cracked and rutted surface; adequate strength for 20-yr. traffic estimates	Open-graded friction course on a leveling course	REGULAR INTER- STATE unless rutting is excessive	REGULAR INTER- STATE	REGULAR INTER- STATE	REGULAR INTER- STATE and RRR can both be justified
Low skid numbers; cracked and rutted surface; inadequate strength for 20-yr. traffic estimates	Open-graded friction course on 3 inches of dense graded bitum- inous concrete	RRR	REGULAR INTER- STATE and RRR can both be justified	Previously, RRR. Due to reduction in RRR matching ratio, FHWA would now approve REGU- LAR INTERSTATE at State request.	RRR
Adequate skid num- bers; smooth sur- face; adequate strength	Open-graded friction course	Probably would not be funded	Normally would not be funded	Might not be funded	Would not be funded
Adequate skid num- bers; cracked and rutted surface; adequate strength for 20-yr. traf- fic estimates	Open-graded friction course on a leveling course	Probably REGULAR INTERSTATE, but this is a gray area	Might not be funded unless part of safety upgrad- ing, then REGULAR INTERSTATE	Might not be funded	RRR
Adequate skid num- bers; cracked and rutted surface; inadequate strength for 20-yr. traffic estimates	Open-graded friction course on 3 inches of dense graded bitum- inous concrete	RRR	REGULAR INTER- STATE and RRR can both be justified	Official was too uncertain to respond	RRR

^{1/} Joint response of two officials