

HIGHWAY REHABILITATION PROJECTS

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INTRODUCTION

This paper pertains to three types of projects which are requiring much of our time in road design. These projects are modernization, safety, and "3R"—resurfacing, restoration, and rehabilitation.

MODERNIZATION PROJECTS

A modernization project involves some of our oldest highways, highways which may have been built 35-40 years ago, are usually four-lane pavements which have seen a lot of traffic, have no access control, and are in poor condition. This type of project may involve the following design considerations.

1. Widening of pavement and existing turn lanes.
2. Resurfacing of pavements and existing turn lanes to increase service life.
3. Construction of bituminous shoulders, left and or right turn lanes.
4. Removal of wire rope guard rail and guide posts and erection of the newest type guard rail.
5. Widening bridges to shoulder width.
6. Protection of bridge railings with guard rail.
7. At twin structures, the construction of protective earth barriers in the median.
8. At underpass structures, protection of bridge piers with impact attenuators or guard rail.
9. Removal of lip gutter and curbs within 30 ft. of the edge of pavement where drainage will not be disrupted.
10. Extend box culverts and slab top culverts to shoulder width.
11. Provide a skid resistant surface.
12. Construct a concrete median barrier and glare screen on highways with narrow medians and high traffic counts.

13. Reconstruction of bridge decks and blocking out of bridge railings with guard rail so that the face of the guard rail is on line with curbs on the bridge.
14. Construction of underdrains.
15. Bituminous patching.
16. Bituminous expansion joints.
17. Underseal existing pavement.
18. Removal of projecting headwalls on larger pipes, extending pipes to 30 ft. from the edge of pavement and connecting pipe end sections.
19. Mounding earth around headwalls on smaller pipes.
20. Removal of existing guard rail where it is felt it is not needed.
21. Clear and regrade gore areas in interchanges.
22. Extend deceleration and acceleration lanes at interchanges.
23. Remove curbs at crossovers.
24. Revise drainage due to the addition of left turn lanes.
25. Resurface and rebuild county road approaches to meet present standards.
26. Review points of access and eliminate as many as possible.
27. Review crossovers and eliminate as many as possible.
28. Review existing side ditch drainage.
29. Replace damaged or nonstandard pipes under drives.
30. Widen farm field drives to meet present standards.
31. List proposed points of access on plans.
32. Show limited access R/W and access control lines on plans.
33. Show type of fence required on limited access R/W lines.
34. Before the project is let for construction, coordinate road design work with traffic department as to relocating existing signs, new signs required, pavement striping and maintenance of traffic.

The above shows that modernization projects are quite involved and require extensive design work to update this type of highway.

SAFETY PROJECTS

Safety projects are not nearly as involved, since they usually involve fully access-controlled highways, such as interstate highways, or have partially controlled access. These highways have usually been built in the last 15 years and the main concern on these projects is safety.

In a California study, involving single car accidents, of 722 drivers tested, alcohol content was found at a significant 74% of the time, drugs were significantly present in 13% of the cases, and natural death was involved about 5% of the time. Is this normal for other states? How do we protect the drunk driver?

Many cars leave the highway but are not involved in an accident. If their cars are only slightly damaged and driveable, they drive off without reporting an accident, since their car insurance may be increased if they did report an accident.

In a study on I-65 from S.R. 131 north to Taylorsville, 101 vehicles left the roadway, but only 17 accidents were reported. Therefore only 17% of the accident victims could be interviewed, which represents a very small sample. Why did these people leave the highway? Was it due to drinking, drugs, health problems, mechanical problems, distractions, speed, falling asleep, other vehicles, headlight glare, weather conditions, or the highway geometrics? Until we know the answer to this question and research data is compiled, it is very difficult to develop a scale for safety.

An engineering analysis today requires recognition of three factors—the cost, the effectiveness, and the probability with which one is associated with the other.

Current methodologies are not comprehensive enough to deal with the problem of finding the overall cost-effective roadside safety design. There must be some distance beyond which it is uneconomical and impractical to remove obstacles. As a general rule, we are, where possible, removing obstacles within 30 ft. from the edge of pavement. If the obstacle cannot be removed, then it is protected by guard rail. If the obstacle is a sign or street light, it is being made to break-away. We are starting to use, as a guide, a booklet written by the Federal Highway Administration titled, "Guide For Selecting, Locating, and Designing Traffic Barriers."

3R PROJECTS—RESURFACING, RESTORATION AND REHABILITATION

The third type of project is known as a RRR or 3R project and was implemented under the provisions of the Federal Highway Act of 1976. The three R's stand for resurfacing, restoration, and rehabilitation of the existing pavement and shoulders on the mainline, ramps, frontage roads, and bridge decks. This type of project could include repair of joints, pavement undersealing, grinding, or grooving of pavement, addition of underdrains, resurfacing to provide additional structure, and

new pavement markings. This type of project cannot include funding for modernization, safety, or maintenance type work. At the present time, we have approximately \$4,250,000 to fund four projects of this type, scheduled for March, April, and May lettings.