A Design Trends
Diet for Roads?

Also: Winter Maintenance • IBC Awards

1906-2004 98 Years of Excellence
Features

16 HIGH ABOVE THE VALLEY
Geology and surface terrain influence design of Mingo Creek Viaduct

19 BROOKLYN'S MEMORABLE SEASON
New bridge features 100-year life and will be complete in less than a year

24 DRIVE ON A DIET
Restructuring lanes leads to improved safety and quality of life

26 COMMUNITY-ACCESS DESIGN
Public input approach resurfacing in the road/bridge industry

29 SPECIAL ATTENTION
The right pavement markings can serve as a wake-up call for motorists

33 HEAVY ACCUMULATION
FHWA, state and local agencies gather ideas from Japan and Europe that promise improvements in winter road maintenance

44 A LUKEWARM EMBRACE
Public sector still needs to take advantage of technology

48 CRAWLING FORWARD
Skid steers keep getting more powerful and more versatile

53 PRODUCT PORTFOLIO

Departments

EDITORIAL 5
ROADS REPORT 7
MAILBAG 8
LAW: THE CONTRACTOR'S SIDE 9
SPANNING THE NEWS 10
TRIP TALK 52
INNOVATIONS IN TECHNOLOGY 63
DOWN THE ROAD 65
AD INDEX 73
LOOKING BACK 74

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Increased traffic volumes on four-lane undivided roadways degrade service and safety. In cities throughout the world, roadways have been put on “road diets,” and these improvements have generated benefits to all modes of transportation including transit riders, bicyclists, pedestrians and motorists.

A road diet entails converting a four-lane undivided roadway to a two-lane roadway plus a two-way left-turn lane by removing a travel lane in each direction. The remaining roadway width can be converted to bike lanes, on-street parking and/or sidewalks. The resulting benefits include reduced vehicle speeds, improved mobility and access, reduced collisions and injuries, and improved livability and quality of life.

Road diet projects can be designed and constructed by simply re-striping the roadway and reusing the existing pavement width and curbs. The addition of landscaped medians, improvements to pedestrian crossings and facilities, street trees and curbside planters, and improved transit user facilities such as bus shelters are optional for an enhanced road diet project.

In the city of Vancouver, Wash., a section of Fourth Plain Blvd. was recently put on a road diet by re-stripping the four-lane undivided roadway to a two-lane roadway with a two-way center left-turn lane and adding bicycle lanes. Before the project, heavy truck traffic and bicycles were forced to share the roadway. Bicyclists were often observed using the sidewalks. After the road diet was completed at Fourth Plain Blvd., the bike lane added a buffer to pedestrians and to entering vehicles. Bicyclists now use the bike lane and pedestrian activity has increased. Traffic along the road diet section of the roadway operates adequately, without severe congestion.

Recent studies of road diet conversions indicate reduced vehicle speeds, collisions and injuries, and improved mobility and access for all modes of transportation. It has been shown that road diets have minimal effect on vehicle capacity by moving the left-turn movements out of the through traffic into the center turn lane.

In a four-lane undivided roadway, the left through lane of the roadway is often used as the left-turn lane. As traffic volumes increase, these left-turn vehicles find it increasingly more difficult to make the left turn and thus cause considerable delay to the through movements. Moving left-turn movements out of the main traffic flow to the center-turn lane results in less vehicle friction and reduces rear-end collisions as well. However, implementing road diets on roadways with an average daily traffic of over 20,000 vehicles per day can result in increased traffic congestion that may lead to traffic diversion to alternate facilities. Road diet studies have shown traffic diversion ranging from 2 to 15%, which has not been reported as a problem in most jurisdictions.

On four-lane undivided roadways, drivers change lanes to pass slower moving vehicles and to pass vehicles stopped in the left through lane waiting for a traffic gap to make a left turn. This adds friction, vehicle conflicts and reduces roadway performance. In addition, drivers can use the left-turn lane as a passing lane and drive faster with a spare lane in their travel direction. On two-lane roadways, vehicle speeds are limited by the leading vehicle.
Shedding speed

Travel speeds have shown to be reduced by road diet projects. For example, a recent road diet project in Clear Lake, Iowa, shows a 50% reduction in aggressive speeding (aggressive speeding vehicles are vehicles traveling five or more miles per hour over the posted speed limit). Reductions in overall average vehicle speeds often result in less severe and fewer collisions.

Road diet benefits for pedestrians and transit users include improved and safer crossing of the street since the number of through-traffic lanes to cross the street is reduced from four to two lanes. In addition, road diets have been shown to reduce speeds, which make pedestrian crossings easier.

After the road diet conversion, there is improvement in comfort level and safety for all modes of transportation traveling along the street. Vehicles have a buffer with the addition (re-stripping) of a bike lane or on-street parking which moves vehicles further from fixed objects such as utility poles, fire hydrants and other objects. The road diet has been shown to increase uniform traffic flow and reduce collisions from turning movement conflicts. With the addition of bike lanes, bicyclists have a dedicated bike lane and no longer have to travel in a mixed-use vehicle lane. Pedestrians also gain more separation from motorists with the bike lane or on-street parking as a buffer.

It’s in the handbook

When determining the appropriateness of a road diet conversion project, site-specific conditions such as traffic flow characteristics, vehicle capacity, traffic operations, safety and livability are all considered.

A handbook is being developed by the author, titled Handbook for Livable Streets: Setting Trends by Applying the “Road Diet,” which will satisfy a need for more reliable information on the effects of road diets. Currently, a recommended practice handbook on road diets does not exist, but public opinion has not been surveyed and livability impacts of road diets (while they have been perceived anecdotally to have improved) have not been evaluated in any formal research effort.

This handbook will provide a comprehensive report on best practices for road diets. Intended as practitioners’ comprehensive guide for decision-making on the applicability of road diets, it will contain information on planning, analysis, design and implementation, including:

- A compilation of results from previous research efforts and identification of significant gaps in the field;
- Analyses of safety and traffic operations issues;
- Livability considerations and case-study evaluation;
- Guidelines for identifying and evaluating potential road-diet sites, design concepts such as typical cross-sections, implementation and lessons learned from experiences; and
- Overall recommended practice for the implementation of road diets.

This handbook will evaluate the livability impacts of road-diet projects, addressing such issues as comfort and safety for pedestrians, bicyclists and transit users; increased landscaping and beautification opportunities; and improved quality of life and street character. The livability survey is being administered along four-lane undivided and three-lane streets with comparable width, character and traffic flow. It is modeled from surveys conducted by Donald Appleyard in Livable Streets (1981) and solicits information from people living and working adjacent to the streets with factors directly related to its livability.

Five sites in the U.S. and countries internationally have been chosen for the survey and data collection. Surveys are expected to be completed in Vancouver, Wash.; Clear Lake, Iowa; Athens, Ga.; Toronto, Ontario, Canada; and Dunedin, New Zealand.

At these locations, before and after conversion data is being collected to support or refute and to further evaluate the livability, safety and operational effects of road diets. The data collected will include traffic volumes, vehicle speed and flow characteristics, collision rates and types, congestion, delay, queuing, cross-section design, existence of multi-modal facilities, pedestrian crossings, property values, real estate turnover, median income and sales tax revenues.

This research will advance the state-of-the-practice and address a significant gap need for more reliable information on the effects of road diets. As this data becomes available to city planners and engineers in the U.S., the expectation is there will be a greater emphasis on road-diet projects throughout the country.

Rosales is a senior transportation engineer with Parsons Brinckerhoff in Portland, Ore. She is currently completing the Road Diet Handbook, which will be published in the fall.