DOWNLOAD PDF HIGHWAYS, A GUIDE TO THEIR DESIGN AND RE-DESIGN

Chapter 1 : - Highways, a guide to their design and re-design by Lester Abbey

But there are still plenty of bumps in the road. Ledbetter, a North Carolina traffic engineer, had devoted his career to creating roads that allowed cars to move faster. Complete streets would slow cars down, reworking roads to accommodate bicyclists, transit users and pedestrians, including people pushing baby strollers and riding in wheelchairs. He took the classes three times. The first time, he wrote off the idea. The second time, he figured it might be feasible in big cities like Charlotte and Raleigh. The third time, he started thinking about how he could use it in his own work. The opportunity came when leaders from West Jefferson, a town of 1, people, approached him about improving its main downtown strip. Ledbetter suggested getting rid of two stoplights and replacing them with all-way stop signs. That would save the state money and make the downtown easier to walk through. He also recommended repainting the road to make it look friendlier to pedestrians. Its board approved the deal on a vote on a Monday night; by Thursday, the street was repainted and the traffic lights were gone. A wine shop and a brewery opened up, along with stores selling jewelry, kitchen gadgets and antiques. The number of vacant downtown storefronts dropped from 33 to three. Of course, the street design was not the only factor in play. West Jefferson benefited from a decade-old plan to revitalize downtown, not to mention a wealth of local artistic talent that helped with the transformation. But promoting foot traffic was a catalyst for bigger changes. West Jefferson may be a very small place, but its new approach reflects a movement that has gained strength quickly. The notion that roads should not be built just for cars and trucks is having profound effects on public spaces. Indianapolis has gone on a sidewalk-building spree. Protected bike lanes, virtually nonexistent in the United States a decade ago, are cropping up all over the country. The roster of local governments that have officially committed to complete streets now numbers more than Still, even the most ambitious jurisdictions are a long way from seeing their vision fully realized. And elements of a backlash are starting to emerge. There is no definitive template for what makes a complete street, but there are many common elements. Bike lanes, especially ones separated from automobile traffic, are the most obvious. The prototype for complete streets, the overhaul of Ninth Avenue in New York City, included a protected bike lane among its many new features. The revamped street showed other cities that bike lanes could be physically separated from vehicle traffic by more than painted lines. It is now almost common to see bike lanes cordoned off from cars using curbs, planters and other barriers, which increase safety and comfort for cyclists while discouraging drivers from illegally parking in the lanes. Protected bike lanes are now found in 24 states and 53 U. Improvements aimed at pedestrians are an equally familiar feature of complete streets. Wide sidewalks make it easier for walkers to pass one another. Bigger sidewalks in commercial areas also encourage passersby to window-shop and allow restaurants to offer outdoor seating. Designing the sidewalks to bulge into intersections in bulb shapes or stick into the street with sharp corners means pedestrians have less pavement to cross before getting to the other side. The sharper angles make it harder for drivers to whip around corners at high speeds, reducing the risk to pedestrians and bicyclists. Some features make travel smoother for motorists and transit users. One of the most common changes is to convert a four-lane road, with two lanes in each direction, into a three-lane road, with one lane in each direction and a central turn lane. Other features include bus shelters that keep riders out of the middle of the sidewalk, and bus bays that make it easier for bus drivers by letting them pull out of traffic when picking up fares. Many of the complete streets ideas are borrowed from European cities where they have been successful, including Amsterdam, Copenhagen and Stockholm. Groups such as People for Bikes take U. But what works well for dense cities filled with medieval architecture and pint-sized diesel hatchbacks does not always translate directly into solutions for American cityscapes. More and more, U. One group encouraging experts to trade ideas is the National Association of City Transportation Officials NACTO , which has released design guides specifically for bike infrastructure and urban street design. The main principle of the urban street design guide is that streets are public spaces. They belong to the people. They should be designed with people in mind. That was fairly new in U. This template shows protected bikes lanes, as well as sidewalk bump-outs and islands that are meant to protect pedestrians by slowing down traffic and giving walkers a safe place to stop when the light turns red. But Malcolm Dougherty, the director of the California Department of Transportation CalTrans , says state agencies are increasingly incorporating complete streets principles into their playbooks too. Seventeen states now have complete streets policies. It is working through a detailed plan -- its second -- to absorb complete streets ideas in its everyday work. But Dougherty admits that other California municipalities need considerable prodding to incorporate complete streets into their designs. The Wisconsin law, passed in , required all road projects using state or federal money to incorporate sidewalks and bike lanes, although the law included exceptions for, among other things, excessive cost or damage to the environment. In West Allis, a working-class Milwaukee suburb, the state proposed adding bike lanes to a six-lane highway that is one of the biggest commercial corridors in town. Many of the stores, fast-food restaurants and hotels either run right up to the street or rely on a single row of parking there. To accommodate the new bike lanes, the state would have had to widen the road by 10 feet. Some designs called for even more land to be taken. Daniels also worried about the safety of cyclists on the road. It was just one of many examples, according to Daniels, of the state overzealously promoting complete streets with projects that did not make sense. He fought another proposal that would have required the city to remove more than 80 trees to make way for bike lanes. Meanwhile, West Allis has been building bike lanes and bike paths elsewhere in the city. To Daniels, the decision of where a city should put bike lanes and sidewalks should be based on how much use they will get and how much they would cost. Daniels shared his frustrations with state Rep. Joe Sanfelippo, who represents West Allis in the Assembly. The lawmaker started pushing for changes through legislation, and Gov. Affected localities can now veto those proposals as well. Dave Cieslewicz, a former Madison mayor who heads the Wisconsin Bike Federation, worries that the change will prevent the state from building networks of bike lanes. It could hinder the development of small-town commercial districts and block the construction of paved shoulders in rural areas, which benefit both cyclists and motorists. Repealing complete streets, he says, may discourage cyclists from riding their bikes and could lead to more cyclist injuries and deaths. In North Carolina, traffic engineer Ledbetter has not wavered in his commitment to the complete streets idea. One of his most ambitious efforts was a proposed road diet for a four-lane highway near West Jefferson, which would allow the state to add bike lanes and a center turn lane. It was the only four-lane road in the county, and local residents worried they would get stuck behind trucks with no way to pass them for miles. The town got rid of two stoplights and replaced them with all-way stop signs and repainted the road to make it look friendlier to pedestrians. The transformation has reinvigorated the area. Town of West Jefferson But Ledbetter has had better luck convincing other towns to get rid of their traffic lights, even though they can be a point of pride in small communities. Leaders in nearby towns have seen the improvements in West Jefferson that came from pedestrian-friendly streets, and they want to try something similar. As some of the missteps in Wisconsin show, overhauling decades of street design is no easy task. Many cities, he notes, start by building one bike lane at a time, because every project, especially the first one, takes energy, time and political capital. But as more protected lanes are added, all of the parts of the bike network become more useful. Ideally residents would walk for less than five minutes to take care of most of their day-to-day tasks, from going to work to buying groceries to visiting the doctor. Good bike networks make it easy for residents to travel within three miles of their home; transit can serve them for trips longer than that.

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Chapter 2 : Geometric design of roads - Wikipedia

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Sight distance[edit] Sight Distance, by Type [14] Road geometry affects the sight distance available to the driver. Sight distance, in the context of road design, is defined as "the length of roadway ahead visible to the driver. Insufficient sight distance can adversely affect the safety or operations of a roadway or intersection. The sight distance needed for a given situation is the distance travelled during the two phases of a driving maneuver: Perception-reaction time is the time it takes for a road user to realize that a reaction is needed to a road condition, decided what maneuver is appropriate, and start the maneuver. Maneuver time is the time it takes to complete the maneuver. The distance driven during perception-reaction time and maneuver time is the sight distance needed. During highway design and traffic safety investigations, highway engineers compare the available sight distance to how much sight distance is needed for the situation. Depending on the situation, one of three types of sight distances will be used: Stopping sight distance[edit] Main article: Stopping sight distance Stopping sight distance is the distance traveled during perception-reaction time while the vehicle driver perceives a situation requiring a stop, realizes that stopping is necessary, and applies the brake , and maneuver time while the driver decelerates and comes to a stop. Actual stopping distances are also affected by road conditions, the mass of the car, the incline of the road, and numerous other factors. For design, a conservative distance is needed to allow a vehicle traveling at design speed to stop before reaching a stationary object in its path. Typically the design sight distance allows a below-average driver to stop in time to avoid a collision. It is longer than stopping sight distance to allow for the distance traveled while making a more complex decision. The decision sight distance is "distance required for a driver to detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered, recognize the hazard or its threat potential, select an appropriate speed and path, and initiate and complete the required maneuver safely and efficiently". Intersection sight distance[edit] Intersection sight distance is the sight distance needed to safely proceed through an intersection. The distance needed depends on the type of traffic control at the intersection uncontrolled, yield sign, stop sign or signal , and the maneuver left turn, right turn, or proceeding straight. All-way stop intersections need the least, and uncontrolled intersections require the most. Intersection sight distance is a key factor in whether no control or yield control can be safely used, or more restrictive control in needed. Corner sight provides an adequate time for the waiting user to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right, without requiring through traffic to radically alter their speed. Uncontrolled and yield controlled intersections[edit] Uncontrolled and yield give way controlled intersections require large sight triangles clear of obstructions in order to operate safely. At uncontrolled intersections, the basic right-of-way rules apply either yield to the vehicle on the right, or the boulevard rule , depending on the location. Vehicle drivers must be able to see traffic approaching on the intersecting road at a point where they can adjust their speed, or stop if need be, to yield to the other traffic before reaching the intersection. Changing an intersection to stop control is a common response to poor safety performance. Two-way stop control[edit] When determining corner sight distance, a set back distance for the vehicle waiting at the crossroad must be assumed. Set back for the driver of the vehicle on the crossroad has been standardized by some state MUTCDs and design manuals to be up to a minimum of 10 feet plus the shoulder width of the major road but not less than 15 feet.

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Chapter 3 : Roads Are Getting a Redesign

Highways, a guide to their design and re-design by Abbey, Lester. RWS Books. PAPERBACK. RWS Books, Trade paperback; has a small worn spot on the front cover where a sticker was removed, otherwise VG condition.

A Robust Solution for Highway Infrastructure Advances in the science of concrete materials have led to the development of a new class of cementitious composites called ultra-high performance concrete UHPC. The mechanical and durability properties of UHPC make it an ideal candidate for use in developing new solutions to pressing concerns about highway infrastructure deterioration, repair, and replacement. Since , when UHPC became commercially available in the United States, a series of research projects has demonstrated the capabilities of the material. UHPC is a cementitious composite material composed of an optimized gradation of granular constituents, a water-to-cementitious materials ratio less than 0. The mechanical properties of UHPC include compressive strength greater than Ultra-high performance concrete has a discontinuous pore structure that reduces liquid ingress, significantly enhancing durability compared to conventional and high-performance concretes. UHPC is being considered for use in a wide variety of highway infrastructure applications. The high compressive and tensile strengths allow for the redesign and optimization of structural elements. Concurrently, the enhanced durability properties facilitate a lengthening of design life and allow for potential use as thin overlays, claddings, or shells. In the United States, UHPC has been used in prestressed concrete girder simple-span bridges, precast concrete deck panels, and field-cast connections between prefabricated bridge components. Ultra-high performance concretes have demonstrated exceptional performance when used as a field-cast closure pour or grout material in applications requiring the onsite connection of multiple prefabricated elements. This use of UHPC has gained significant momentum recently, with States around the country considering the application. Field-cast UHPC can simplify connection details and ease constructability. This photo shows the casting of fluid ultra-high performance concrete UHPC from a wheelbarrow into the void space between the top flanges of two deck-bulb-tee prestressed concrete girders. The rebar can be seen extending from the girders into the void. The UHPC is self-consolidating. New York State Department of Transportation. UHPC is also being investigated for use in a variety of other applications. These applications include precast concrete piles, seismic retrofit of substandard bridge substructures, thin-bonded overlays on deteriorated bridge decks, and security and blast mitigation applications. In a general sense, UHPC has proven to be particularly relevant in applications where conventional solutions are lacking. For example, conventional connection solutions have hindered the use of prefabricated elements; field-cast UHPC allows for a redesign and simplification of the system while simultaneously promoting long-term durability. The report compiles more than 30 years of worldwide research, more than English-language references, and 12 years of Federal Highway Administration FHWA research and development into a first-of-its-kind reference document for UHPC. This report is expected to spur further innovation in the field as innovators will now have an easier time building on the work of their predecessors. It will also provide support to technical experts around the United States as they begin facilitating deployment of UHPC technology. Wednesday, August 29, Related Links.

Chapter 4 : Texas Highways - The Official Travel Magazine of Texas

A key challenge faced by engineers using the AASHTO Guide for Design of Pavement Structures (AASHTO Guide) is the selection of appropriate design values for the subgrade soil and for the pavement materials. Until now, the information available to help engineers choose appropriate values has.

Chapter 5 : Ultra-High Performance Concrete | FHWA

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Chapter 6 : Sign Guidelines and Applications Manual: Temporary Signs and Banners Not Placed by TxDOT

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