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For discussion by the California Bicycle Advisory Committee
December 1, 2011

Proposed Experimental Procedure for Bicycle Facility Design

At its April 7, 2011, meeting, the California Bicycle Advisory Committee (CBAC) approved a motion "that Caltrans move forward to develop a process that encourages local agencies to do experiments for bikeways including, but not limited to, designs included in the NACTO Guide."

NACTO is the National Association of City Transportation Officials, and the NACTO *Urban Bikeway Design Guide* is intended, as it states, to "to provide cities with state-of-the-practice solutions that can help create complete streets that are safe and enjoyable for bicyclists. . . . Most of these treatments are not directly referenced in the current versions of the AASHTO Guide to Bikeway Facilities or the Manual on Uniform Traffic Control Devices (MUTCD)." These treatments may likewise be absent from, or incompatible, with the California Manual on Uniform Traffic Control Devices (California MUTCD) or the Caltrans Highway Design Manual (HDM) or both.

There is increasing interest in and request for these and other unconventional approaches to bicycle accommodation, but the process for determining whether they are suitable for inclusion in these manuals is incomplete. Current California law and Caltrans policy provide a procedure for Caltrans and local agencies to experiment with nonstandard traffic control devices, but there is no corresponding procedure for highway design standards, including those for bicycle facilities.

This paper discusses the reasons for this difference, and proposes a process for carrying out CBAC's recommendation.

Traffic Control Devices

The Vehicle Code requires that Caltrans adopt uniform standards and specifications for traffic control devices, and all official traffic control devices must conform to them:

> 21400. The Department of Transportation shall, after consultation with local agencies and public hearings, adopt rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to this code, including, but not limited to, stop signs, yield right-of-way signs, speed restriction signs, railroad warning approach signs, street name signs, lines and markings on the roadway, and stock crossing signs . . .
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> 21401. (a) . . . [O]nly those official traffic control devices that conform to the uniform standards and specifications promulgated by the Department of Transportation shall be placed upon a street or highway. . . .

The repository of these standards and specifications is the California MUTCD, which states explicitly in its Introduction:

> **Standard:**
> **The California MUTCD is hereby adopted as, and shall be the standard for all official traffic control devices, under . . . Section 21400 of California Vehicle Code.**

(Blue text indicates material specific to the California rather than the national MUTCD.)

A standard is defined as follows:

> **Standard—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All standards are labeled, and the text appears in bold type. The verb shall is typically used. . . .**

The California MUTCD reiterates that all traffic control devices must conform (Section 1A.07, Responsibility for Traffic Control Devices):

> **Standard:**
> **In accordance with CVC Section 21401, only traffic control devices conforming to Department of Transportation standards and specifications shall be placed on streets and highways.**

And again in Section 1A.08, Authority for Placement of Traffic Control Devices:

> **Standard:**
> **CVC 21400 provides that the Department of Transportation shall, after consultation with local agencies and public hearings, adopt rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to the provisions of the Code.**
> **CVC 21401 provides that only those official traffic control devices that conform to the uniform standards and specifications promulgated by the Department of Transportation shall be placed upon a street or highway.**

This section also notes that:

> **Standard:**
> **The use of unauthorized traffic control devices is prohibited by CVC 21465. Prohibited traffic control devices constitute a public nuisance and shall be removed per CVC 21467 . . . .**

Caltrans provides the required consultation with local agencies through the California Traffic Control Devices Committee (Section 1A.07):

> Support:
> Pursuant to the provisions in CVC Section 21400, the Department of Transportation adopts

uniform standards and specifications for all traffic control devices after consultation with local agencies and public hearings. The Department of Transportation consults with local agencies and the public through the California Traffic Control Devices Committee (CTCDC). The Department of Transportation publicizes these uniform standards and specifications for traffic control devices through the California MUTCD.

The legal obligation here is unmistakable. Although Caltrans does not control local traffic control devices, unless they are on state facilities (such as state highways that run through cities or freeway interchanges), or enforce compliance with the California MUTCD (except indirectly through funding processes), any agency that installs a noncompliant device, contrary to the Vehicle Code, potentially exposes itself to liability.

An inflexible set of standards, however, stifles innovation, experimentation, and improvement. Section 1A.10, Interpretations, Experimentations, Changes, and Interim Approvals, therefore provides a means for Caltrans and local agencies to experiment with non-approved devices:

Standard:

The agency shall request and receive approval from the California Traffic Control Devices Committee prior to installation of experimentation devices on public roadways in California.

Support:

. . . Experimentation is defined as research involving the acts of testing, evaluating, analyzing or discovering the effect of a specific device, principle, supposition, etc., usually carried out in an operational context. Experimentation could also be performed in a laboratory. The request for experimentation is a submission specifically requesting approval to use a nonstandard device on public roadways for purposes of gathering verification data.

Submission of Projects

Guidance:

. . . Experimentation requests should contain the following information:

1. A statement indicating the nature of the problem.
2. A description of the proposed change, how it was developed, the manner in which it deviates from the standard, and how it is expected to be an improvement over existing standards.
3. Any illustration, photograph, or videos, which would help, explain the experimental device or use of this device.
4. Any supporting data as to how the experimental device was developed, if it has been tried, in what ways it was found to be adequate or inadequate, and how was this choice of device or application arrived at.

The CTCDC may then either approve the device for limited use on an experimental project, approve the device for limited use in a formal research project, disapprove it until further justification is submitted, or disapprove it altogether.

The California MUTCD provides specific guidelines for experimental proposals:

Guidance:

Each proposal should include:

A. Scope: A detailed description of the experimentation, locations of installation, and number of experimental projects.

B. Work Plan: A description of the proposed plan of study; the variables that are to be measured; the criteria against which the devices is to be evaluated; observations, measures and data which will be collected; whether the experimentation will be carried out in the field or under laboratory conditions; how installations of the experimental device or application will be made; the indication if any adverse effects on safety or traffic operations can be anticipated, together with the means that may be taken to minimize them; and the factors which will be held constant or measured and controlled in order to ensure that the true effects of the device are measured.

C. Time Periods: Time periods for experimentation will normally not be less than six months nor more than two years.

D. Evaluation Procedures: The California Traffic Control Devices Committee will approve criteria, which will be used to evaluate experimental devices or applications. To permit meaningful comparisons with standard installations, advice from specialists such as human factor experts, statisticians, etc., could be included.

E. Reporting: A written status report must be forwarded to the sponsor 45 days prior to each public meeting. A final report must be completed within 90 days of the terminal date of the experimentation and forwarded to the Secretary of the California Traffic Control Devices Committee. Status reports will describe the progress of the work, any particular deviation from the work plan and anticipated time of conclusion. The final report will contain, as a minimum, the basic information on the problem, the preliminary investigations, the proposed solutions, the study procedures, the detailed analysis of the data, the results of the work, a discussion of the results, and whatever conclusions are drawn. If a change in the California MUTCD is proposed, the recommended text (wording) for the California MUTCD should be included.

F. Administration: All experimentation proposals will include the agency sponsoring the study, the agency conducting the study, and the name and titles of principal researchers. There must be proof of professional traffic engineering capabilities and other related professional expertise to perform the experimentation and related evaluation processes.

The project terminates at the end of the experimental period and all experimental installations must be removed, unless the CTCDC grants an extension or permission for continued operation. The process is illustrated in a flow chart in California MUTCD Figure 1A-1(CA).

Caltrans policy is that all experimental proposals that involve bicycle-related issues are referred to CBAC for discussion before consideration by the CTCDC. This procedure is not part of the California MUTCD, and CBAC approval is not a condition for CTCDC approval.

An experimental procedure for traffic control devices offers numerous advantages. It relieves local agencies of liability for nonstandard devices; it enables experimentation with innovative and improved devices in a controlled and rigorous manner that is consistent across jurisdictions; and it provides reliable information for revision of the California MUTCD. The situation is different, however, for highway design.

Highway Design

The Highway Design Manual, on its face (from the Foreword):

> Establishes uniform policies and procedures to carry out the highway design functions of the California Department of Transportation (Department). It is neither intended as, nor does it establish, a legal standard for these functions.
>
> The policies established herein are for the information and guidance of the officers and employees of the Department, as well as external agencies who use or choose to adopt this guidance. . . .

The HDM, in other words, is established only for the benefit of Caltrans on state facilities, though local agencies are free to adopt it voluntarily as their design guide. It has, as a rule, no legal force, and deviations from it do not necessarily create liability. (Agencies might still be well advised to document the reasons for any deviation from generally accepted standards of good engineering practice.) This situation differs significantly from the one for traffic control devices, and as a result there might seem to be no need for a comparable experimental procedure.

But it is only true in general that there is no legal obligation to follow the HDM. The HDM does contain certain mandatory standards, which use the word "shall" and are printed in boldface type. In particular, the Streets and Highways Code provides for such standards:

> 890.6. The department, in cooperation with county and city governments, shall establish minimum safety design criteria for the planning and construction of bikeways and roadways where bicycle travel is permitted. The criteria shall include, but not be limited to, the design speed of the facility, minimum widths and clearances, grade, radius of curvature, pavement surface, actuation of automatic traffic control devices, drainage, and general safety. The criteria shall be updated biennially, or more often, as needed.
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> 890.8. The department shall establish uniform specifications and symbols for signs, markers, and traffic control devices to designate bikeways, regulate traffic, improve safety and convenience for bicyclists, and alert pedestrians and motorists of the presence of bicyclists on bikeways and on roadways where bicycle travel is permitted.
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> 891. All city, county, regional, and other local agencies responsible for the development or operation of bikeways or roadways where bicycle travel is permitted shall utilize all minimum safety design criteria and uniform specifications and symbols for signs, markers, and traffic control devices established pursuant to Sections 890.6 and 890.8.

The uniform specifications for traffic control devices prescribed by §890.8 are maintained in the California MUTCD, and the discussion of that manual above applies. The minimum safety design criteria of §890.6 are currently found in Chapter 1000 of the HDM, Bikeway Planning and Design, which states at Index 1001.1:

> All city, county, regional and other local agencies responsible for bikeways or roads where bicycle travel is permitted must follow the minimum bicycle planning and design criteria contained in this and other chapters of this manual (See Streets and Highways Code Section 891).

Caltrans provides the required consultation with county and city governments through CBAC.

This statement has been revised in the Complete Streets draft of the HDM to read:

> The Streets and Highways Code, Sections 890.6 through 890.8 requires the Department and local agencies to develop design criteria and symbols for signs, markers, and traffic control devices for bikeways and roadways where bicycle travel is permitted. Section 892 further requires local agencies to comply with criteria and uniform symbols.

("Section 892" appears to be a typo for "Section 891.") In this draft some of the bikeway guidance has also been distributed elsewhere in the manual as appropriate.

In both versions, mandatory bikeway criteria are printed in bold and use the word "shall," and are enumerated, along with other mandatory standards, in Table 82.1A, Mandatory Standards. (Note that the footnote "(1) Caltrans-only Mandatory Standard" in this table, at least insofar as it applies to bicycle facilities, does not mean that the standard applies only on state facilities. It means that this is a California standard rather than an FHWA one.) As with traffic control devices, however, enforcement is left to funding processes and the courts.

HDM Index 82.2, Approvals for Nonstandard Design, provides a design exception process for state facilities. But local agencies are left in the awkward position of being required by law to follow the bikeway design criteria in the Highway Design Manual, yet unable to avail themselves of a procedure for experimenting with nonstandard designs.

Proposal

On one hand, this discrepancy between the opportunity to experiment with traffic control devices, but not with bicycle facility design, could lead to excessive conservatism and to design standards based on inadequate empirical information. On the other, agencies that are determined to innovate, or are reacting to popular demand, in practice can and do go ahead in contravention of the standards. By doing so, they may be exposing themselves to liability and users to unnecessary risks in the case of an inferior design, or depriving highway design engineers of reliable experimental data in the case of a superior design.

There is a clear need for an experimentation procedure for bicycle facility design. Caltrans should add to Topic 82 of the HDM, Application of Standards, a section providing for experimental bicycle facilities, closely modeled on the procedure for traffic control devices in Section 1A.10 of the California MUTCD, and cross-referenced from Chapter 1000 and elsewhere. CBAC would fill the role of the CTCDC. In the case of facilities that experiment with both highway design and traffic control devices, both approvals would be needed.