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16. Abstract BIKESAFE is an expert system that is divided into sections titled "Resources" and "Tools." This report is the counterpart to <i>PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System</i> . ¹ The "Resources" section includes a variety of background information, and "Tools" includes 50 engineering, education, enforcement, and support countermeasures or treatments that may be implemented to improve bicyclist safety and mobility. Also included are more than 50 case studies that illustrate these concepts applied in practice in a number of communities throughout the United States. This system and the content of this guide are included on the enclosed CD and are available online at http://safety.fhwa.dot.gov/bikesafe and at http://www.bicyclinginfo.org/bikesafe . The system allows the user to refine his or her selection of treatments on the basis of site characteristics, such as geometric features and operating conditions, and the type of safety problem or desired behavioral change. The purpose of the system is to provide the most applicable information for identifying safety and mobility needs and improving conditions for bicyclists within the public right-of-way. BIKESAFE is intended primarily for engineers, planners, safety professionals, and decisionmakers, but it may also be used by citizens for identifying problems and recommending solutions for their communities. ¹ <i>PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System</i> was authored by David Harkey and Charles Zegeer, with contributions from Cara Seiderman, Peter Lagerwey, Mike Cynecki, Michael Ronkin, and Robert Schneider.					
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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yard	0.836	square meters	m ²
ac	acres	0.405	hectares	ha
mi ²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	oC
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in ²	poundforce per square inch	6.89	kilopascals	kPa
APPROXIMATE CONVERSIONS FROM SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	ac
km ²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE (exact degrees)				
oC	Celsius	1.8C+32	Fahrenheit	oF
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m ²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in ²
*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)				

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HOW TO USE THIS GUIDE

BIKESAFE is an expert system that allows the user to select appropriate countermeasures or treatments to address specific problems. BIKESAFE also includes a large number of case studies to illustrate treatments implemented in communities throughout the United States.

This system and the content of this guide are included on the enclosed CD and are available online at <http://safety.fhwa.dot.gov/bikesafe> and at <http://www.bicyclinginfo.org/bikesafe>. The system allows the user to refine his or her selection of treatments on the basis of site characteristics, such as geometric features and operating conditions, and the type of safety problem or desired behavioral change. The purpose of the system is to provide the most applicable information for identifying safety and mobility needs and improving conditions for bicyclists within the public right-of-way. BIKESAFE is intended primarily for engineers, planners, safety professionals, and decisionmakers, but it may also be used by citizens for identifying problems and recommending solutions for their communities.

BIKESAFE was designed to enable practitioners to select engineering, education, or enforcement treatments to help mitigate a known crash problem and/or to help achieve a specific performance objective. While the majority of the specific treatments are engineering countermeasures, many of the case studies include supplemental enforcement activities (e.g., a course that teaches police about enforcing bicycle safety) and/or educational approaches (e.g., educating people about riding on shared roadways or on roads with bicycle facilities). BIKESAFE uses known characteristics of the environment and permits the user to either view all countermeasures associated with a given objective or crash type or to view only those that are applicable to a defined set (as input by the user) of geometric and operating conditions. The objectives of the product are as follows:

- Provide information about bicycle crash types, statistics and other background resources.
- Provide user with information on what countermeasures are available to prevent specific categories of bicycle crashes or to achieve certain performance objectives.
- Outline considerations to be addressed in the selection of a countermeasure.
- Provide a decision process to eliminate countermeasures from the list of possibilities.
- Provide case studies of countermeasures introduced in communities throughout the United States.

Chapter 1 – The Big Picture gives an overview on how to create a safe bicycling environment. Chapter 2 – Bicyclist Crash Statistics describes basic bicyclist crash trends and statistics in the U.S. Chapter 3 – Selecting Improvements for Bicyclists discusses the approaches to select the most appropriate countermeasures. One approach is based on the need to resolve a known safety problem, while the other is based on the desire to change behaviors of motorists and/or bicyclists.

Chapter 4 – The Expert System describes the Web/CD application, including a description of the overall content and step-by-step instructions for use. Chapter 5 – Countermeasures contains the details of more than 50 engineering, education, and enforcement treatments for bicyclists. These improvements relate to shared roadways; on-road bike facilities; intersection treatments; maintenance; traffic calming; trails/shared-use paths; markings, signs, and signals; education and enforcement; and support facilities and programs. In Chapter 6 – Case Studies are more than 50 examples of implemented treatments in communities throughout the U.S.

Further resources are provided in Chapter 7 – Implementation and Resources, including sections on community involvement in developing priorities, devising strategies for construction, and raising funds for bicycle improvements. A list of useful Web sites, guides, handbooks, and other references is also provided.

There are also two appendices with supporting materials. Appendix A includes an assessment form that can be used in the field to collect the information needed to effectively use the expert system. Appendix B provides a detailed matrix showing the specific countermeasures that are associated with each of the case studies.