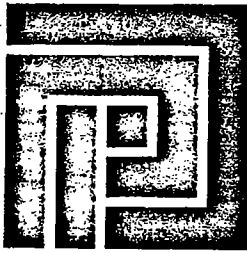
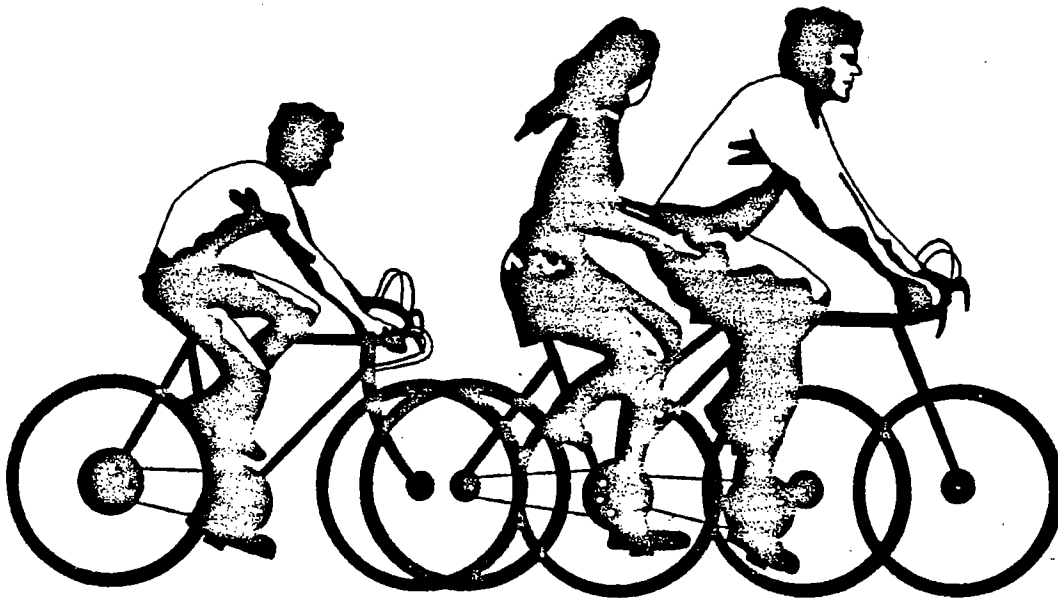


a sub-element of  
the transportation element

department of regional planning  
county of los angeles  
320 west temple street  
los angeles  
california  
90012



## PLAN OF BIKEWAYS



# PLAN OF BIKEWAYS



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# Summary



## BACKGROUND

More than two million Los Angeles County residents use bicycles. They use them to exercise, to save fuel, to have fun. Bikes have become so popular, in fact, that more than 400,000 were sold here in 1973 alone.

People of all ages are now cycling, not only for recreation but for transportation as well. The growing use of the bicycle, particularly for the short and intermediate trip, is proving to be a useful alternative to the automobile. With properly planned routes, the bicyclist can play an important role in reducing traffic congestion, air pollution, and saving energy.

## DESCRIPTION OF THE PLAN

The Los Angeles County Plan of Bikeways is a component of the Transportation Element of the comprehensive Los Angeles County General Plan. It sets forth a coordinated framework for bike routes throughout the County while allowing room for each of the 78 cities within the County to incorporate city routes and unique features of their own. The Plan has been reviewed by all 78 cities as well as by adjacent counties.

The Plan consists of a text describing the background, description of plan, intent of plan, goals and policies, design standards, criteria for corridor selection, and implementation. Accompanying the text is a mapped policy indicating bike-way corridor routes. These should not be interpreted as precise locations. The countywide Plan of Bikeways does not show many of the community or local routes planned by cities and unincorporated neighborhoods. The Plan anticipates that each city will adopt a more detailed bicycle feeder system to supplement the agreed upon county-wide network.

## INTENT OF THE PLAN

The Bikeways Plan has been prepared to guide the development of an interconnected network of countywide bicycle corridors. It recognizes and encourages the use of the bicycle for personal transportation and recreation.

The Plan will serve as a tool for planners, administrators and legislators. Periodic reviews and revisions will be made to provide additional bicycle routes or support facilities as they are warranted and to accommodate changing conditions, trends and interests of the bicycling public.

## GOALS AND POLICIES\*

### GOAL 1

Encourage the development of convenient bicycle routes throughout the County.

### POLICY 1

Develop an interconnected system of bikeways and bikeway support facilities.

### POLICY 2

Require new subdivisions to develop bicycle facilities where feasible.

### POLICY 3

Require redevelopment projects to provide bicycle facilities within their boundaries.

### POLICY 4

Solicit and use all sources of local, regional, state and federal funds to plan, acquire rights-of-way and construct bikeways.

### POLICY 5

Seek new means for acquisition, construction and maintenance of bikeways and support facilities.

### POLICY 6

Utilize existing and abandoned public rights-of-way for present and future bikeways where feasible and a need can be demonstrated.

### POLICY 7

Locate bikeways along designated scenic highways wherever environmentally, physically and economically feasible.

### POLICY 8

Provide trees and other appropriate landscaping along bikeways, whenever feasible.

### POLICY 9

Provide turnouts, shelters, campgrounds, hostels, toilets and trash receptacles for off-road bike facilities, where needed and feasible.

### POLICY 10

Construct bikeways which connect recreational, educational, cultural, commercial and industrial facilities with residential areas.

\*For precise wording of complete Goals and Policies, please refer to pages 9 and 10.

**POLICY 11**

Initiate a program to provide bike racks, lockers and other security devices at public parks, buildings and other activity centers.

**POLICY 12**

Encourage the provision of bike racks, lockers and other security devices at all private activity centers.

**POLICY 13**

Separate bicycle from automobile traffic whenever it is physically and economically feasible to do so.

**POLICY 14**

Accommodate bicycles by modifying and widening existing roadways and shoulders.

**POLICY 15**

Eliminate conflict between bicycles and parked and parking vehicles whenever it is physically and economically feasible to do so.

**POLICY 16**

Initiate a bicycle registration program in unincorporated County areas and encourage other jurisdictions to do the same.

**POLICY 17**

Support state and federal programs which develop and evaluate bicycle equipment standards.

**POLICY 18**

Enact uniform ordinances (in cooperation with other jurisdictions) which control the operation of bicycles on off-road bikeways.

**POLICY 19**

Encourage citizen participation in the planning, financing and development of bikeways.

**GOAL 2**

Initiate comprehensive safety education programs for both bicyclists and motorists.

**POLICY 1**

Encourage adoption of safety education programs which will:

Encourage bicycle safety courses in the public and private school curriculum and similar courses in the high school driver education program.

Encourage preschool and adult bicycle safety courses and make them available through public agencies.

Include on-the-bicycle instruction as part of the safety education program.

Encourage law enforcement agencies to provide bicycle safety and enforcement training for their personnel.

Encourage judicial agencies to provide similar training to their personnel (including juvenile and traffic court judges) who work with the Vehicle Code.

Encourage the Department of Education, the Department of Motor Vehicles, the Highway Patrol and other appropriate agencies to develop a bicycle safety text and distribute this text to all involved in bicycle programs.

Disseminate bicycle safety information to the public via these same agencies.

**POLICY 2**

Continue to publish and distribute brochures and other literature on bicycle safety.

**POLICY 3**

Encourage more uniform and stricter enforcement procedures by law enforcement agencies.

**POLICY 4**

Encourage all judicial personnel who work with the Vehicle Code (including juvenile and traffic court judges) to adopt uniform procedures in dealing with bicycle infractions.

**POLICY 5**

Encourage the news media to make public service announcements regarding bicycle safety and operational rules of the road.

**POLICY 6**

Sponsor a news program which emphasizes the public's need to be made aware of bicycles on the roadway.

**POLICY 7**

Monitor accident and safety data, identify and solve safety problems, and keep the public informed as to the need for strict observance of safety practices.

**GOAL 3**

Provide bikeways which interconnect with other transportation modes.

**POLICY 1**

Coordinate the implementation of bikeways with other transportation modes.

**POLICY 2**

Encourage other agencies to provide space, where feasible, for recreational and commuter bicycles on public transportation systems.

**POLICY 3**

Encourage other jurisdictions to adopt a comprehensive bikeway system which interconnects with the County's system.

**POLICY 4**

Coordinate the planning and implementation of feeder bikeways which connect regional bikeways with regional mass transportation facilities.

## DESIGN STANDARDS AND CRITERIA

### Lane Clearances

Recommended minimum clearances and widths for bike lanes and separate facilities are shown in Figures 5, 6 and 7 (Pages 15 and 16).

### Grade

Where long or severe grades occur, consideration should be given to rest stops or additional widths.

Grades should be less than 7% and preferably no more than 5% or some will have to walk their bicycles.

### Speed

A design speed of 20 mph for a particular facility is generally more than adequate.

When grades exceed 4%, a higher design speed should be used.

### Surface and Base Material

Any surface wearing-course which has been designed to support the loadings imposed by bicycle traffic, maintenance vehicles, or any other type of loading anticipated on the bicycle facility is acceptable. It may consist of processed native material, asphaltic concrete, concrete or any other material or combination of materials capable of providing an all weather surfacing to facilitate bicycle travel.

The bikeway system should be developed in harmony with the natural terrain. It can do this by taking advantage of attractive scenic features while improving less desirable areas by landscaping. If fences are used to separate the bikeway from vehicular traffic lanes, they should be landscaped whenever feasible and consistent with safety.

Bike paths should be located to capitalize on shade from existing trees wherever possible or the perimeters of the paths should be appropriately landscaped with trees and other suitable plant material.

### Safety

The bicycle facility which provides minimum conflict between motor vehicles and bicyclists while maintaining adequate access is usually the safest. In actual practice, however, especially in urban areas, this is difficult to achieve.

Intersections are a big problem. Operators of turning vehicles may not see the cyclist or may not choose to honor his right of way. This is a problem with all types of bicycle facilities including a separate bicycle path which crosses a roadway. Even costly grade separations have not proven effective in some areas since bicyclists will circumvent them if not convenient.

Left turns may be legally accomplished by cycling into the center of the road and turning like a vehicle, but this is of questionable safety to the inexperienced rider. A suggested alternate method for the novice is to walk his bicycle around the intersection on the pedestrian route.

### Parking and Signing

Where parking is permitted, the vehicle parking and leaving the curb will be in direct conflict with the cyclist. Therefore, every effort should be made to prohibit or restrict parking where bike routes or bike lanes are to be established.

Additional pavement widening should be considered in locations where the existing roadway width is inadequate.

Adequate signing which is clear and conveys the message that a bikeway exists in the vicinity of the roadway should be provided for all types of bikeway facilities.

### Maintenance and Drainage

Gratings, curbs and gutters, local depressions, meters, slotted cross gutters, debris from the sweeping action of cars, water on the pavement and deteriorated pavement cause problems for the bicyclist. Remedial measures must be initiated to remove or mitigate as many of these problems as possible.

### Lighting

The cyclist should have reflector pedals and lights clearly visible from the side front and rear.

Bikeway illumination capable of providing nighttime identification and silhouetting of the cyclist should be considered in the design phase.

Bicycle facilities should be illuminated adequately, particularly at decision points and intersections with other facilities.

## CRITERIA FOR CORRIDOR SELECTION

Bikeways shown on the map take advantage of the County's unique and varied terrain and of existing linear land holdings. Locations range from existing streets and highways, beaches, railroad rights-of-way, flood control channels and the California Aqueduct to new freeway rights-of-way, under power transmission lines and larger recreation areas. Routes were selected on the basis of the following considerations:

### Trip Demand

Recommendations from individuals, bicycling groups, citizen advisory groups, city and county planning agencies, city councils and supervisors.

Proximity to existing, already well-traveled corridors.

### Safety

Separation from vehicular traffic.

Lane or roadway width.

Grades.

Traffic volumes.

### Continuity

Interconnections with local, subregional and regional systems.

### Cost

Use of available right-of-way, roadway widths and graded sections.

Selection of least costly alternative whenever possible.

### Impact

Proximity to residences.

Effect on neighborhood.

Closeness to backup subdivisions.

## IMPLEMENTATION

It is economically impractical to immediately initiate every bike route shown in this plan. Early development of many routes is feasible, however, especially if available funds are used judiciously and new funds solicited energetically. Several activities already underway should be continued as part of the Bikeways Plan. These include:

Funding and implementing the bikeways shown on the map.

Coordinating the plan among all County agencies involved in bikeway programming.

Modifying the Building Codes and Land Division and Subdivision Ordinances so that new construction will be encouraged to provide new bikeways and support facilities.

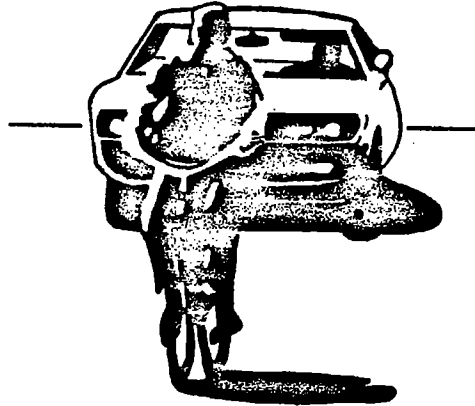
Maintaining the present facilities.

Evaluating the need for additional road widening, signals or other traffic control devices.

Continuing regional, state and federal efforts to standardize bikeway development criteria.

Supporting current County, city, state and federal bikeway projects.

Encouraging private developments to provide racks, lockers or other bike security devices at apartments, shopping centers, parking lots and office buildings.



Several additional activities should be initiated as soon as possible. It is recommended that:

The courts and all law enforcement agencies adopt uniform procedures in handling bicyclists who violate the Vehicle Code.

Local governments adopt uniform ordinances relating to bicycle facilities.

A comprehensive bicycle registration/recovery of stolen bicycles program be developed and that all jurisdictions adopt a similar program.

Educational institutions initiate safety programs patterned after those recommended by the Senate Concurrent Resolution 47 Bicycle Committee (See Goal 2, Policy 1).

County-operated facilities install bike racks and lockers and that other jurisdictions do the same.

The County seek additional regional, state and federal funds for an accelerated bikeway construction program.

## CONCLUSION

In this era of energy shortages, air and noise pollution and rising costs, the bicycle offers a quiet, economical, non-polluting alternative to the automobile, especially for shorter trips of from three to seven miles. But, just as the automobile has needed support programs from its years of early development to its present stage of maturation, the bicycle needs them now. The 1501 mile countywide Bikeway Plan can help turn these needs into a safer, strategically located network of facilities, one that will be available to anyone choosing to use it.

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# 1. Introduction



Across the United States and locally, there has been a resurgence of interest in bicycling. Persons of all ages have taken to the riding of bicycles for recreation, exercise, and transportation. Many individuals are discovering that the use of the bicycle, particularly for short and intermediate trips is proving to be a viable and economic alternative to the automobile.

This renewed interest in the use of the bicycle is evidenced both locally and nationwide by increased bicycle sales, increasing numbers of bicycle-related accidents and demand for safe facilities to accommodate the bicyclists.

The Bikeway Plan for Los Angeles County has been prepared to plan for and implement an interconnected network of Countywide bicycle corridors to accommodate bicycle transportation needs. It recognizes and encourages the use of the bicycle for personal transportation and recreation.

This Plan is a Sub-element of the Transportation Element of Los Angeles County and will be included in the Transportation Element when it is revised. It is also complementary to the Noise, Scenic Highway and Open Space Elements of the General Plan since it advocates the establishment of a quiet, non-polluting transportation mode throughout the County as well as along scenic and recreation corridors outlined in the Scenic and Open Space Elements. As additional elements of the General Plan are adopted, or amended, they will be complementary to the element. The land use relationship such as the location of commercial, educational, residential and recreational centers as well as population density and settlement patterns will be addressed in the Transportation and Land Use Elements of the General Plan as mandated by state law.

The Sub-element proposes a coordinated approach to providing bicycle facilities throughout Los Angeles County. It has been submitted to all 78 cities in this County, as well as Orange, Ventura, San Bernardino and Kern Counties. It has also been submitted to the Southern California Association of Governments, the California Department of Transportation, the Citizens Planning Council and various other planning organizations and governmental committees for review and approval.

This Plan identifies major intercity and intercommunity bicycle corridors which will, when implemented, enhance bicycle transportation in this County. These corridors which are shown on the Map on page 11 have been reviewed by the 78 cities, Federal, State and Regional agencies. The Plan anticipates that each city, or groups of cities, as well as unincorporated communities will adopt a more detailed bikeways feeder system which will interconnect and supplement the regional system of bicycle corridors shown on the Map on page 11. These subsidiary systems, when adopted together with the corridors delineated in this Plan, will constitute a comprehensive system of bikeways.

The Plan will be reviewed periodically and revised as necessary to provide additional bikeways or support facilities as they are warranted and to accommodate changing conditions, trends and interests of the bicycling public.



## 2. Terms Defined



The term "bikeway" is used for all facilities that explicitly provide for bicycle travel. It, like the term "bike route", is a generic term which connotes a bicycle course which is to be traveled. These facilities may be classified into the following three major categories: <sup>1</sup>

### OFF-ROAD

#### Bike Path or Trail – Class I

A bike path is a special pathway designated for the exclusive use of bicycles. Crossflows by pedestrians and motorists are minimized. It is usually separated from motor vehicle facilities by a space or physical barrier. It may be on a portion of a street or highway right-of-way or on a special right-of-way not related to a motor vehicle facility; it is usually grade separated but it may have street crossings at designated traffic controlled locations. It is identified with guide signing and also may have pavement markings.

### ON-ROAD

#### Bike Lane – Class II

A bike lane is a lane on the paved area of a road for preferential use by bicycles. It is usually located along the edge of the paved area outside the traveled lanes or between the parking lane and the first motor vehicle lane. It is identified by "Bike Lane" or "Bike Route" guide signing, special lane lines, bicycle symbols or "Bikes Only" stencils on the pavement and other pavement markings or signs deemed appropriate to give adequate instructions to the users of the facility. Bicycles usually have exclusive use of a bike lane for longitudinal travel, but must accommodate crossflows by motorists at driveways and intersections and also by pedestrians at various locations.

### Shared Route – Class III

A shared route is a roadway identified as a bicycle facility by "Bike Route" guide signing only. There are no special lane markings and bicycle traffic shares the roadway with motor vehicles. Special regulations may be enacted and posted along such facilities to control motor vehicular speeds or restrict parking to enhance bicycling safety.<sup>2</sup>

It should be noted that the 18,481 miles of surface roadways in Los Angeles County are being used by the bicycling public even though they are not presently delineated as bikeways. The Vehicle Code allows this use and it is anticipated that this Code will continue to allow roadways to be used by the bicyclists in the future. When the bikeway facilities shown in this Plan have been implemented, these roadways will act as a feeder system which facilitates access to the regional and local bikeway systems from the various communities located throughout the County.

The term "bicycle" as used throughout this Sub-element is defined in the California Vehicle Code as: a device upon which any person may ride propelled by human power through a belt, chain or gears and having either two or three wheels in a tandem or tricycle arrangement.<sup>3</sup>

The term "Plan of Bikeways" as used in this Sub-element refers to the written text contained in this document and the corridors shown on the Map on page 11.

# 3. Assets and Opportunities



Los Angeles County is a region of topographic and scenic diversity. The terrain of the region includes coastal beaches, sand dunes and marshes, coastal plains, broad valleys, gentle high plains, mountains, rolling hills, desert and offshore islands. This diversity of natural topographic features presents a variety of scenic experiences which can be enjoyed by the bicyclist. Climatological diversity, ranging from arid desert to a Mediterranean type climate, with very few days of inclement weather also provide ample opportunity for the bicyclists to use this mode of transportation in this County.

Bicycles are a non-polluting quiet form of transportation. They do not consume energy and are very economical to purchase, operate and maintain. Since they are so economical, they are readily available to all segments of the population. In addition, they contribute to the general health of the users by keeping them physically fit.

The majority of the urbanized areas of the County are located south of the San Gabriel Mountains in a massive area of approximately 1100 square miles. This urban sprawl has contributed to the transportation problems of the area.

In the urbanized areas residential development, especially in the older communities, is generally located in close proximity to schools, shopping areas, neighborhood schools and certain recreational and entertainment centers. This neighborhood development pattern is conducive to the use of the bicycle for a variety of short range trips of from 3 to 7 miles for transportation purposes.

Within the urbanized areas of this County there are a number of linear systems available for use by bicyclists, and there are a number of other linear systems which can be used to accommodate bicycle transportation facilities. Together these systems constitute a comprehensive grid network of transportation facilities capable of accommodating bicycle transportation throughout the County. The linear systems are listed below.

Bikeways may be constructed or implemented along these systems where a need for bicycle facilities can be demonstrated and it is physically feasible to implement safe, convenient bikeways to accommodate bicycle transportation.

		EXISTING MILEAGE
<b>ROADWAYS</b>	Arterial Highways	5,921
	Conventional State Highways	428
	Expressways	12
	Local Streets	12,120
	Freeway Rights of Way	482
	<b>Total Roadways <sup>4</sup></b>	<b>18,963</b>
<b>FLOOD CONTROL CHANNELS</b>	Los Angeles Flood Control District <sup>5</sup>	422
<b>RAILROADS</b>	Railroad Mainlines <sup>6</sup>	560
<b>UTILITY RIGHTS OF WAY</b>	Power Transmission Lines	380

# 4. Problems and Issues



The bicycle is a transportation and recreation mode for approximately seven to ten million people in California and for an estimated two million persons in Los Angeles County. New bicycle sales have been increasing steadily through 1973. According to the Bicycle Institute of America, nationwide sales totaled 3.7 million bicycles sold in 1960. In 1973, this figure had risen to a record 15.6 million or more. Figure 1 graphically portrays this increase in sales through 1972. Locally, bicycle sales in 1973 were estimated to be approximately 400,000 units.<sup>7</sup>

With this increase in sales and use of the bicycle came an increase in bicycle-motor vehicle accidents. In 1969, the California Highway Patrol recorded 5,244 such accidents including fatalities. In 1972, the number had more than doubled to 10,622. In 1973, it decreased slightly to 10,535 and for the first 11 months of 1974, the number of such accidents totaled 10,319.<sup>8</sup>

Clearly much work needs to be done to: improve existing roadways, provide additional well-designed cycling facilities, promote bicycle and driver safety education programs and provide consistent enforcement of statewide laws and local ordinances to improve the situation for both the cyclist and the motorist.

The problems and issues of the Plan of Bikeways for Los Angeles County relate to the following broad areas of concern which will be discussed in detail: user characteristics and types of bicycle riders, increasing numbers of bicycle accidents, insufficient roadway width, large volumes of traffic and urban development patterns, uniform standards, uniform enforcement of ordinances, multiplicity of governmental jurisdictions, safety programs, support and maintenance programs and the legal rights of bicyclists on the roadways.

## A. User Characteristics and Types of Bicycle Riders

Cycling activity falls into two categories: recreational and utility oriented riding. For recreational cyclists (racers, tourers, exercisers, and general pleasure riders) the trip itself is the objective. For the utility oriented cyclist the objective is not the trip but reaching a specific destination — place of employment, school, home, a store, recreation or community activity center. Because of this destination consciousness the utility oriented cyclist places highest priority on directness of routes, acceptable grade profiles and minimized delay and inconvenience.<sup>9</sup>

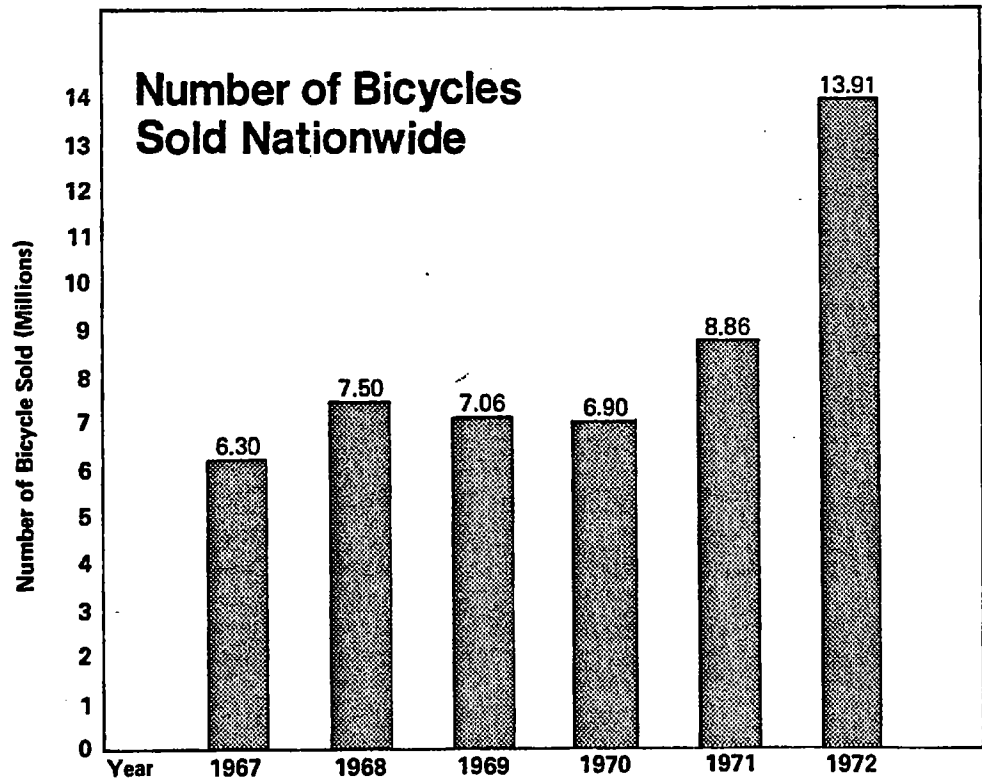


FIGURE 1. THE RISE IN BICYCLE SALES

In urban areas, the number of trips and the composite of trip purposes characterized as utility riding normally equal recreational trips. In rural areas, recreational riding is more prevalent. In Los Angeles County, both types of trips are accommodated along our roadway systems and existing bicycle facilities.

Bicycle facilities provided for the public must also be capable of accommodating a broad cross section of the bicycling public. For there will be youngsters, teens, young adults, middle aged, and the aged riders using these facilities for bicycle transportation. Also the facilities must be capable of accommodating bicyclists with varying degrees of expertise and proficiency ranging from the expert bicycling groups to the novice who is just learning the rudiments of bicycling and may not be able to read.

**B. Increasing Number of Bicycle Accidents**

A recent bicycle accident report compiled by the Los Angeles County Road Department indicates that bicycle accidents increased 160% between 1966-1972. Figure 2 graphically depicts this increase in accidents.<sup>10</sup>

This dramatic increase in bicycle-motor vehicle accidents in many cases is largely due to the careless behavior or lack of understanding and failure to follow the rules of the road by the bicyclist.

Figure 3 graphically portrays the causes of 972 accidents investigated by the Los Angeles County Road Department between bicyclists and motor vehicles in 1972.<sup>11</sup>

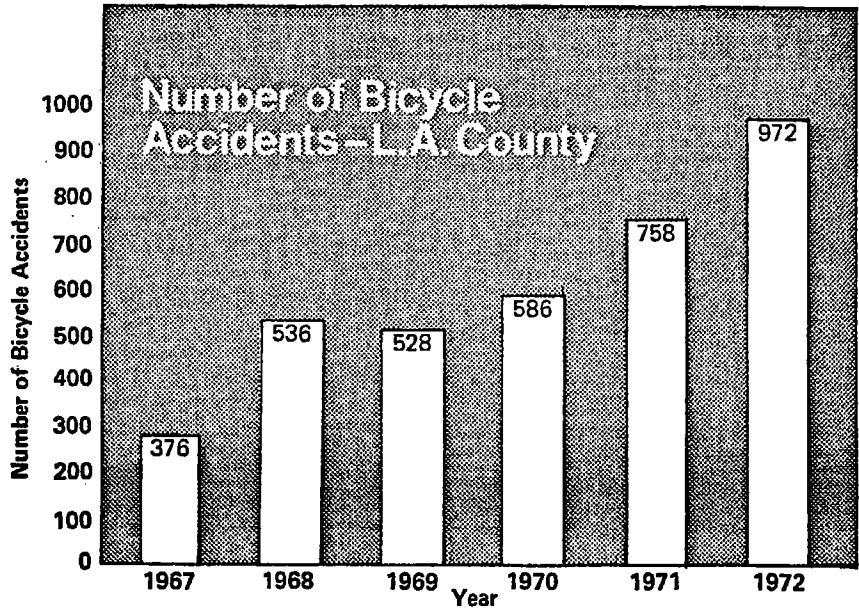


FIGURE 2. THE RISE IN BICYCLE ACCIDENTS

VIOLATION	0	5%	10%	15%	20%	25%
Bicyclist entered street from driveway or alley	[Bar chart showing 19%]					
Bicyclist swerved into path of motor vehicle	[Bar chart showing 14%]					
Bicyclist on wrong side of street; head on	[Bar chart showing 9%]					
Other actions; bicyclist at fault	[Bar chart showing 8%]					
Motorist at fault	[Bar chart showing 7%]					
<b>MIDBLOCK BICYCLE ACCIDENTS = 57% OF TOTAL</b>						
VIOLATION	0	5%	10%	15%	20%	25%
Bicyclists on wrong side of street Hit by right-turning vehicle	[Bar chart showing 11%]					
Bicyclist violated motorist's right-of-way	[Bar chart showing 8%]					
Bicyclist ran stop or signal	[Bar chart showing 7%]					
Other actions; bicyclist at fault	[Bar chart showing 9%]					
Motorist at fault	[Bar chart showing 8%]					
<b>INTERSECTION BICYCLE ACCIDENTS = 43% OF TOTAL</b>						

FIGURE 3. VIOLATIONS CAUSE ACCIDENTS

Other facts revealed from this accident study are as follows:

- There is a trend toward older juveniles and adults riding bicycles which results in more accidents in the older age group.
- The four summer months of June through September account for the highest percentage of accidents, 12% per month.
- Over ½ of the bicycle accidents occur between 3 p.m. and 7 p.m.
- The percentage of nighttime accidents is rising.
- Sixty-percent of accidents occur in residential areas but the number occurring in commercial areas is increasing.
- About ½ of bicycle accidents occur on arterial streets.
- Two-thirds of all intersection accidents occur on arterial highways.
- Eighty-seven percent of all mid-block accidents occur on streets with light to moderate parking.<sup>12</sup>

With the rapid growth of bicycle usage comes the obvious and pressing need for increased bicycle safety. While new facilities may ameliorate some of the conditions leading to accidents, the major share of bicycle travel will still be mixed with motor vehicles using a common thoroughfare. In an encounter between a 150-pound bicycle rider and a 3000-pound automobile the bicyclist in 99% of the cases is injured.<sup>13</sup>

One solution to this problem, which has proven to be effective, is more effective bicycle safety education in our schools and news media for both bicyclists and motor vehicle operators. This educational effort should emphasize the need to obey the rules of the road, the fundamentals of defensive riding and driving, and the need to be aware of the rights of other vehicles operating on our roadway transportation systems.<sup>14</sup>

For regardless of fault, there is presently a lack of driver awareness of the bicyclist and his rights to use the roadway system. As more bikeway facilities are provided, the signs, markings and enforcement procedures will also tend to educate the public in the safe, effective use of the systems provided.

### C. Insufficient Roadway Width, Large Volumes of Traffic and Urban Development

In our automobile oriented society, a system of roadways has evolved to handle the traffic needs of the various segments of the community.

Local and collector streets provide access and egress to the residential and commercial areas and handle the traffic and parking demands generated in these areas. This traffic then flows onto the arterial system of roadways which interconnects with the freeway system to form a comprehensive network of roadways to accommodate a variety of trips to home, work, commerce, education, shopping and pleasure.

Because of our dependence on the motor vehicle as the main source of transportation, traffic volumes seem to increase in direct proportion to urban development. Consequently, the development of adequate roadway-systems to handle these increased volumes usually lags behind the traffic demands imposed on the road system by increased development. Thus, many of the existing roadways become congested with excessive traffic requiring the complete utilization of all available roadway space to handle traffic demands leaving no room to accommodate separate bicycle facilities or lanes within the road right-of-way. Because of this situation, bicycle traffic sometimes utilizes an entire traffic lane causing motor vehicles to veer into adjacent lanes on roadways where the right lane is not wide enough to accommodate both bicycle and motor vehicle traffic.

Also, as urban development progresses, strip commercial areas, apartment dwellings, and condominiums are allowed to develop along many of the arterial roadways with minimum setback distances from the roadway and minimal off-street parking to accommodate the needs of this type of development. This also presents problems for the effective development of bicycle facilities along roadways so impacted because of the high parking demand along the roadway and insufficient space adjacent to the road to accommodate widening or an off-road bicycle facility.

### D. Uniform Standards

There is considerable variance in the bikeway design standards being used nationally, in California, and locally. This diversity is particularly noticeable in the areas of bikeway widths, capacity, design speeds, curvature and grade profiles.

The minimum widths for one-way bikeways, recommended by the Institute of Transportation and Traffic Engineering are in a report prepared for the State of California in 1972. For a two-way, separate bike facility, it is recommended that the width be increased an additional 3 feet to accommodate the additional "shy" distance needed for head-on bicycle traffic.<sup>15</sup>

It should be noted that the dimensions shown are minimum widths. Bicyclists frequently like to ride two abreast, not single file, as shown in this diagram. In the design of a bicycle facility, this factor as well as capacity, grade, speed, need for super-elevation and curve widening, horizontal and vertical sight distances and clearances will need to be evaluated and the facility designed to accommodate these factors. Graphical presentations of the recommended geometrical relationships of these factors may be found in a Federal Department of Transportation publication entitled "Bikeways State of the Art 1974".

Also, the State of California Highway Design and Traffic Manuals recommend minimum standards for striping and signing to be used in the implementation of bikeways. These standards are shown in Section 7-1000 of the Design Manual and Chapter 6 of the Traffic Manual.

#### E. Safety Programs

In a recent report to the California Legislature, the SCR 47 Bicycle Committee endorsed the following recommendations of the California Traffic Safety Education Task Force.<sup>16</sup>

1. That the California State Department of Education study and adopt the framework of the programs recommended for each of the target groups identified by the Task Force Bicycle Resource Panel, and that these programs be pilot tested and put into a form useful to California schools and other agencies in counteracting the California bicycle accident problem.

2. That various funding sources be explored for the purpose of development and testing of comprehensive traffic safety education programs including the teaching of bicycle safety, or where appropriate, special bicycle safety programs.

3. More research should be conducted to determine whether the critical behaviors outlined by the Task Force Bicycle Resource Panel for each age group are in fact those contributing to the greatest number of bicycle accidents. If this were known, our educational system could be better designed also that it would become more effective in preparing young cyclists for safe roadway operation.

4. Further research should be conducted to determine ways of modifying negative traffic attitudes and deviant traffic behaviors among bicyclists and motorists alike. These methods must be incorporated into the educational program because poor attitude is as much a factor in bicycle accidents as is lack of knowledge of the rules of the road.

5. K-12 grade bicycle safety education programs should be implemented by the Department of Education in cooperation with the local school districts as part of the school curriculum, either separately or integrated with other appropriate subjects.

6. All schools in California should provide some instruction in bicycling skills, hazard identification and avoidance techniques, and related proficiency requirements before a child is allowed to bring his bike to school.

Although there are some safety programs currently being practiced by various jurisdictions in this County, there is a definite need for a concentrated, coordinated countywide safety education program which encompasses all levels of society. Such a program should consider and incorporate the following recommendations of the SCR 47 Bicycle Committee:<sup>17</sup>

1. Bicycle safety education should be provided in public and private schools annually from kindergarten through twelfth grade, including high school driver education courses.

2. Preschool and adult courses should be made available through public agencies.

3. Bicycle safety education should strongly emphasize how to follow the Vehicle Code rules, rather than just require memorization of the rules.

4. Bike safety education must include on-the-bicycle on-the-road (or simulated road) practice to develop proper bicycle handling expertise in both normal and emergency situations.

5. The Commission on Peace Officer Standards and Training (POST) should include mandatory bicycle safety and enforcement training in both the Basic Course and the Advanced Officer course required of officers from departments participating in the program.

6. Juvenile court judges, traffic court judges and referees, and all other judicial personnel who work with Vehicle Code violation adjudication should be required to take the same bicycle safety and enforcement motivation program as that provided for peace officers.

7. The California Department of Education, in conjunction with the California Department of Motor Vehicles, the California Highway Patrol, and other appropriate agencies (including user groups and local public agencies) should develop an adult level bicycle safety information text and disseminate such to all State and local government personnel involved in bicycle program activities.

8. The Department of Motor Vehicles, Highway Patrol and local law enforcement agencies should take a leading role in a public information effort advising motorists and other road users of their rights and responsibilities in relation to bicyclists, as well as making motorists aware of the bicyclists' needs on the roadway.

9. Adequate funding for implementation of the above recommendations should be appropriated by the State Legislature to assure statewide uniformity.

If such a comprehensive safety program were initiated, it would contribute greatly to the reduction of bicycle — automobile accidents in this County.

#### F. Enforcement of Ordinances

The California Vehicle Code defines bicyclists as vehicle operators for the purpose of enforcing the rules of the road and accident reporting. This principle provides good guidance for cyclists and other highway users providing the laws are obeyed. In most accidents involving bicyclists and motorists, the bicyclist is usually in violation of one or more laws. Many bicyclists and motorists do not seem to know that bicyclists are subject to the same rules of the road as motorists. This problem is compounded when local jurisdictions enact laws such as mandatory sidewalk riding, restrictions requiring bicyclists to turn left from the right-hand edge of the roadway and requiring motorists to turn right from a position that is not near the right hand edge of the roadway. These special rules confuse cyclists and motorists alike and can cause misunderstanding and accidents.

