

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

2008

**REGIONAL TRANSPORTATION PLAN**

*Making the Connections*



***Transportation  
Safety Report***



# TRANSPORTATION SAFETY

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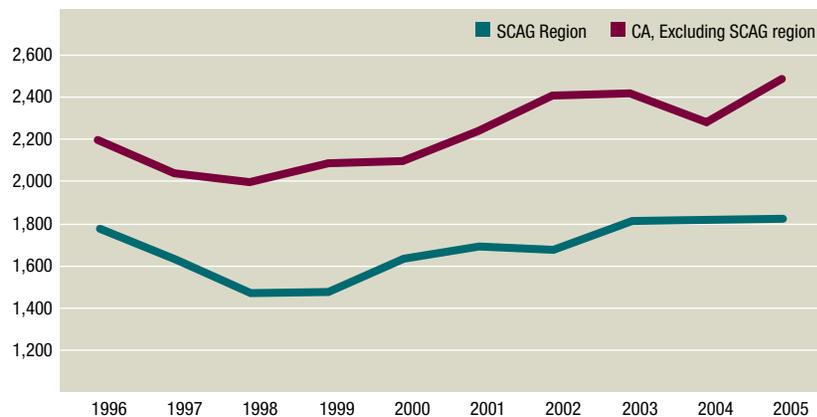
## Existing Conditions

The SCAG region has an extensive transportation system with over 50,000 freeway and arterial lane-miles. The region had 10.7 million licensed drivers and 13 million registered vehicle in 2005. The same year, over two million people rode public transit daily. Unfortunately, in the SCAG region, 1,825 people were killed and 149,811 were injured in traffic collisions.

Deaths and injuries from traffic accidents are significant concerns for the SCAG region. In 2005, just over 1,800 people in the SCAG region were killed in traffic accidents. In California, 4,304 were killed in 2005 as indicated in Figure 1 and Figure 2.

In addition, as can be see in Figure 2, traffic injuries in the SCAG region surpassed the state in 2002.

**FIGURE 1 TRAFFIC FATALITIES (1996-2005)**

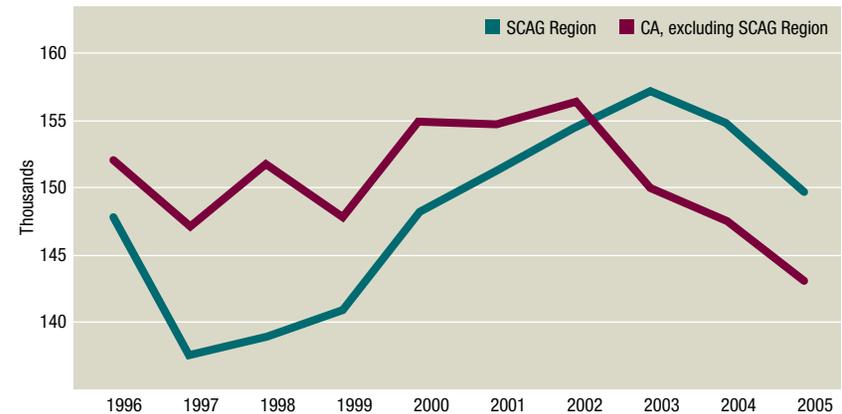


Source: SWITRS

While traffic fatalities in the SCAG region are below the rest of California (the SCAG region represents almost half of California's population), the number of fatalities, after declining in the latter part of the 1990s, has increased every

year since 1999. Table 1 and Table 2 indicate, by county, the traffic fatalities and injuries in the SCAG region.

**FIGURE 2 TRAFFIC INJURIES 1996-2005**



Source: SWITRS

## Consequences of Accidents in the SCAG Region

While much of the growth in fatalities and injuries can be attributed to the growth in vehicle miles traveled, it represents an unacceptable personal burden on those involved. There is also a regional burden in lost productivity, increased traffic congestion and pollution.

The National Safety Council reports that the calculable costs of motor-vehicle crashes are wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employers' uninsured costs.

**TABLE 1 TRAFFIC FATALITIES (1996-2005)**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Imperial	35	65	62	35	55	45	49	45	56	46
Los Angeles	863	764	624	684	749	768	728	816	750	745
Orange	197	175	157	175	164	207	193	215	215	205
Riverside	278	253	269	231	266	262	312	303	321	333
San Bernardino	333	312	300	297	318	334	334	357	409	425
Ventura	71	61	58	59	87	73	66	79	70	71
SCAG Region	1,777	1,630	1,470	1,481	1,639	1,689	1,682	1,815	1,821	1,825
California, excluding SCAG region	2,195	2,041	1,989	2,078	2,091	2,237	2,407	2,410	2,273	2,479

Source: SWITRS

**TABLE 2 TRAFFIC INJURIES (1996-2005)**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Imperial	1191	1212	1313	1264	1172	1324	1219	1231	1159	1040
Los Angeles	91540	82096	82218	83978	88801	91443	92744	92557	90042	86582
Orange	22326	22611	23070	22780	22996	23043	22782	24173	23917	23028
Riverside	11216	10941	11358	11752	12968	12700	14291	15105	15805	15966
San Bernardino	15408	14695	14743	15255	15786	16107	16517	17022	17299	16929
Ventura	6274	6096	6167	5912	6418	6646	6892	7085	6587	6266
SCAG Region	147955	137651	138869	140941	148141	151263	154445	157173	154809	149811
California Excluding SCAG Region	152151	147220	151829	147786	154882	154644	156244	149993	147548	142987

Source: SWITRS

The average costs for each traffic death, traffic injury, or property damage crash were (in 2005):

Death	\$1,150,000
Nonfatal Disabling Injury	\$52,900
Property Damage Crash (including nondisabling injuries)	\$7,500

In addition, for 2005, the National Safety Council further defined injury costs as<sup>1</sup>:

Incapacitating injury	\$60,500
Nonincapacitating evident injury	\$19,600
Possible injury	\$11,100

When examined historically, fatal and injury collisions (rate per million vehicle miles traveled) have steadily decreased in California since the 1930s. It is only recently that national rates have fallen to the same rate as California, although it should be noted that comparable national statistics have only been collected since the latter 1980s.

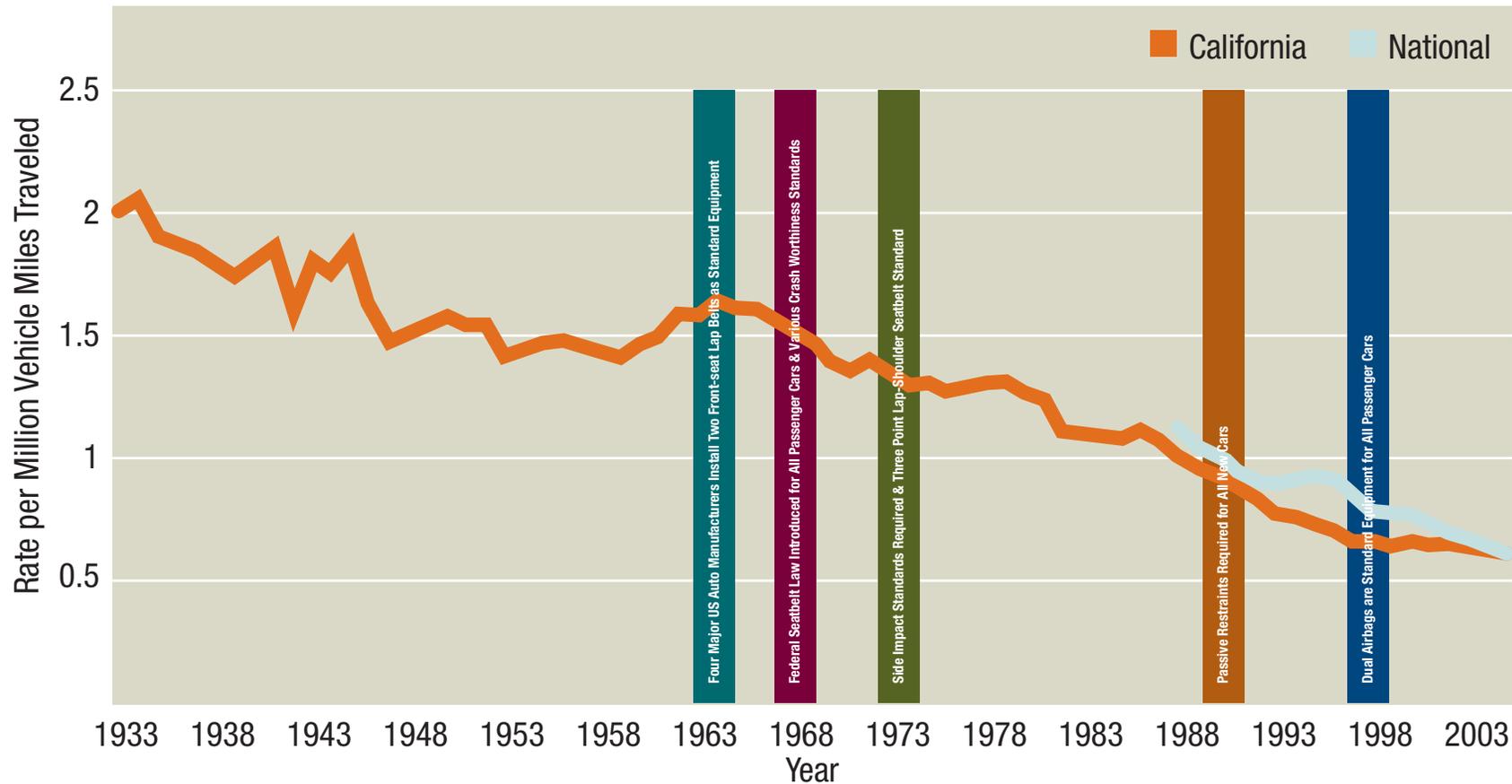
<sup>1</sup> National Safety Council "Estimating the Costs of Unintentional Injuries, 2005" <http://www.nsc.org/lrs/statinfo/estcost.htm>

Figure 3 indicates the historical drop since the 1930s. In addition, the chart is marked to indicate the time periods when safety devices were introduced or mandated in the United States.

It is important to note, that although the fatal and injury collision rate per million vehicle miles traveled has decreased, the number of vehicle miles traveled is increasing.

The 2008 RTP forecasts that Vehicle Miles Traveled (VMT) will increase to 552 Million VMT in 2035. This represents a 35% increase over the existing 409 million VMT.

**FIGURE 3 FATALITY AND INJURY COLLISIONS**



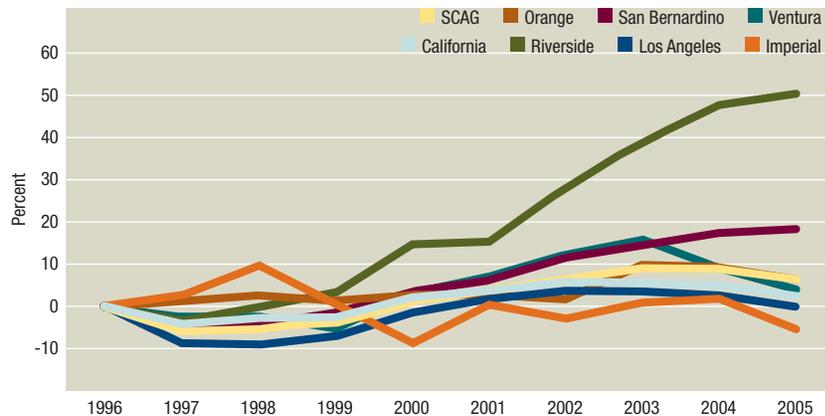
Sources: 1) California Highway Patrol, 2005 Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions; 2) National Traffic Safety Administration, Traffic Safety Facts 2005

Figure 4 indicates an increase in the number of fatal and injury collisions in the SCAG region since 1996, particularly in the Inland Empire, where VMT has increased at a faster rate than other parts of the region.

However, a reduction in the accidents per million VMT, while laudable, does not necessarily eliminate an increase in accidents, in absolute numbers.

The goal of this safety report is to assist in the reduction of the absolute numbers of traffic fatalities and injuries within the SCAG region to the goals indicated in the California Strategic Highway Safety Plan.

**FIGURE 4 GROWTH IN FATALITY AND INJURY COLLISIONS SINCE 1996**



Source: California Highway Patrol, 2005 Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions

## Primary Causes of Collisions

Table 3 and Table 4, on the next two pages indicate the number of fatal and injury collisions, respectively, in California in 2005, sorted by the movement preceding the collision. In reviewing the data, the predominant fatal collision type is a broadside collision where the preceding movement was the vehicle proceeding straight.

For injury accidents, the broadside collision described above also predominates, closely followed by rear end collisions where the preceding movement was the vehicle proceeding straight. With other factors taken into account, such as other movements preceding collision, rear end collisions are the most common type of accident, with 142,278 injury accidents in 2005. Broadside collisions followed with 111,369 injury collisions, representing 39% and 30% of all injury accidents respectively.

Per SAFETEA-LU, SCAG's RTP should be consistent with the California Strategic Highway Safety Plan (SHSP), which is discussed on the following pages. In research for the SHSP, the data indicates that intersections and turns/rights of way are significant factors in many collisions within the various challenge areas (drunk driving, elderly drivers, bicycling, etc.). By placing the highest emphasis on intersection safety within each challenge area, SCAG hopes to meet the goals of the SHSP to reduce transportation fatalities as well as increase transportation safety in the region.

**TABLE 3 DRIVERS IN FATAL COLLISIONS IN CALIFORNIA BY TYPE OF COLLISION BY MOVEMENT PRECEDING COLLISION (2005)**

	COLLISION TYPE								TOTAL
	Head-On	Sideswipe	Rear End	Broadside	Hit Object	Overtaken	Auto/ Pedestrian	Other	
Movement Preceding Collision									
Proceeding straight	543	239	366	988	301	130	576	69	3,212
Ran off road	14	8	14	10	462	185	7	10	710
Other	1	23	22	11	179	72	6	4	318
Making left turn	25	7	2	238	5	7	30	2	316
Crossed into opposing lane	202	31	2	31	5	7	1	3	282
Other unsafe turning	27	12	10	12	90	49	8	1	209
Stopped	9	4	123	46	4	4	13	5	208
Changing lanes	2	37	27	5	17	13	10	2	113
Slowing/stopping	10	4	50	6	2	5	6		83
Passing other vehicle	32	15	5	10	10	7	3		82
Entering traffic		1	2	43	2	1	4	1	54
Traveling wrong way	46	1		2	2	1	1		53
Making right turn	2	2	1	10	6	3	26	1	51
Not stated	5		3	14	4	1	7	3	37
Making U turn		1		18	2				21
Backing			2	1	2		11	2	18
Merging			1		1	2			4
Parked*			2				1		3
<b>TOTAL</b>	<b>918</b>	<b>385</b>	<b>632</b>	<b>1,445</b>	<b>1,094</b>	<b>487</b>	<b>710</b>	<b>103</b>	<b>5,774</b>

Source: SWITRS

**TABLE 4 DRIVERS IN INJURY COLLISIONS IN CALIFORNIA BY TYPE OF COLLISION BY MOVEMENT PRECEDING COLLISION (2005)**

	COLLISION TYPE								TOTAL
	Head-On	Sideswipe	Rear End	Broadside	Hit Object	Overtaken	Auto/ Pedestrian	Other	
Movement Preceding Collision									
Proceeding straight	11,855	17,964	66,063	69,238	10,472	3,666	6,022	3,458	188,738
Stopped	1,151	1,833	49,491	4,217	220	86	240	511	57,749
Making left turn	5,922	2,086	1,274	24,602	816	331	1,794	919	37,744
Slowing/stopping	157	555	17,878	511	228	210	139	213	19,891
Ran off road	283	185	198	158	7,562	2,838	56	161	11,441
Making right turn	621	1,260	1,487	3,508	551	194	1,630	649	9,900
Changing lanes	70	4,866	2,441	693	1,062	426	23	156	9,737
Other	79	1,094	619	455	4,976	1,353	62	91	8,729
Entering traffic	196	602	292	3,857	84	67	154	183	5,435
Other unsafe turning	262	620	556	349	2,169	863	59	79	4,957
Making U turn	126	279	152	1,931	68	42	32	64	2,694
Crossed into opposing lane	1,327	625	43	283	167	80	12	29	2,566
Not stated	95	182	710	390	149	47	131	288	1,992
Backing	41	110	489	457	84	19	490	265	1,955
Passing other vehicle	139	704	175	457	144	97	60	42	1,818
Traveling wrong way	276	97	11	96	55	11	9	15	570
Merging	14	188	192	76	42	23	10	17	562
Parked*	25	126	137	43	17	2	15	49	414
Parking maneuver	10	65	70	48	21	6	32	9	261
<b>TOTAL</b>	<b>22,649</b>	<b>33,441</b>	<b>142,278</b>	<b>111,369</b>	<b>28,887</b>	<b>10,361</b>	<b>10,970</b>	<b>7,198</b>	<b>367,153</b>

Source: SWITRS

## The California 2006 Annual 5 Percent Report

SAFETEA-LU establishes a new core Highway Safety Improvement Program (HSIP) structured and funded to reduce fatalities on all public roadways. A provision of the new HSIP requires all states to submit an annual report to the Federal Highway Administration (FHWA) by August 31 of each year describing not less than 5 Percent of their public roadway locations exhibiting the most severe safety needs. At the time of this report, the 2007 5 Percent Report had not been published. So the 2006 report will be used.

From the California 2006 Annual 5 Percent Report:<sup>2</sup> the California 2006 Annual 5 Percent Report is not intended to be used as a tool for the allocation of funding for, or prioritization of, State roadway safety projects.

The California Annual 5 Percent Report serves to:

- Satisfy the Highway Safety Improvement Program (HSIP) reporting requirement.
- Raise public awareness of the safety needs and challenges in the State.
- Raise awareness of the importance of traffic safety data.

The locations identified in the 2006 Annual 5 Percent Report are based on available roadway and collision data for the State Highway System only (city and county roadway locations are not included for the 2006 report).

Areas of the 2006 5 Percent Report that are located in the SCAG region are delineated on Table 5 on the following page, as well as graphically represented in Exhibit 1. It is important to note that under 23 U.S.C. 148(g)(4) information collected or compiled for any purpose directly relating to the 5 Percent Report shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports.

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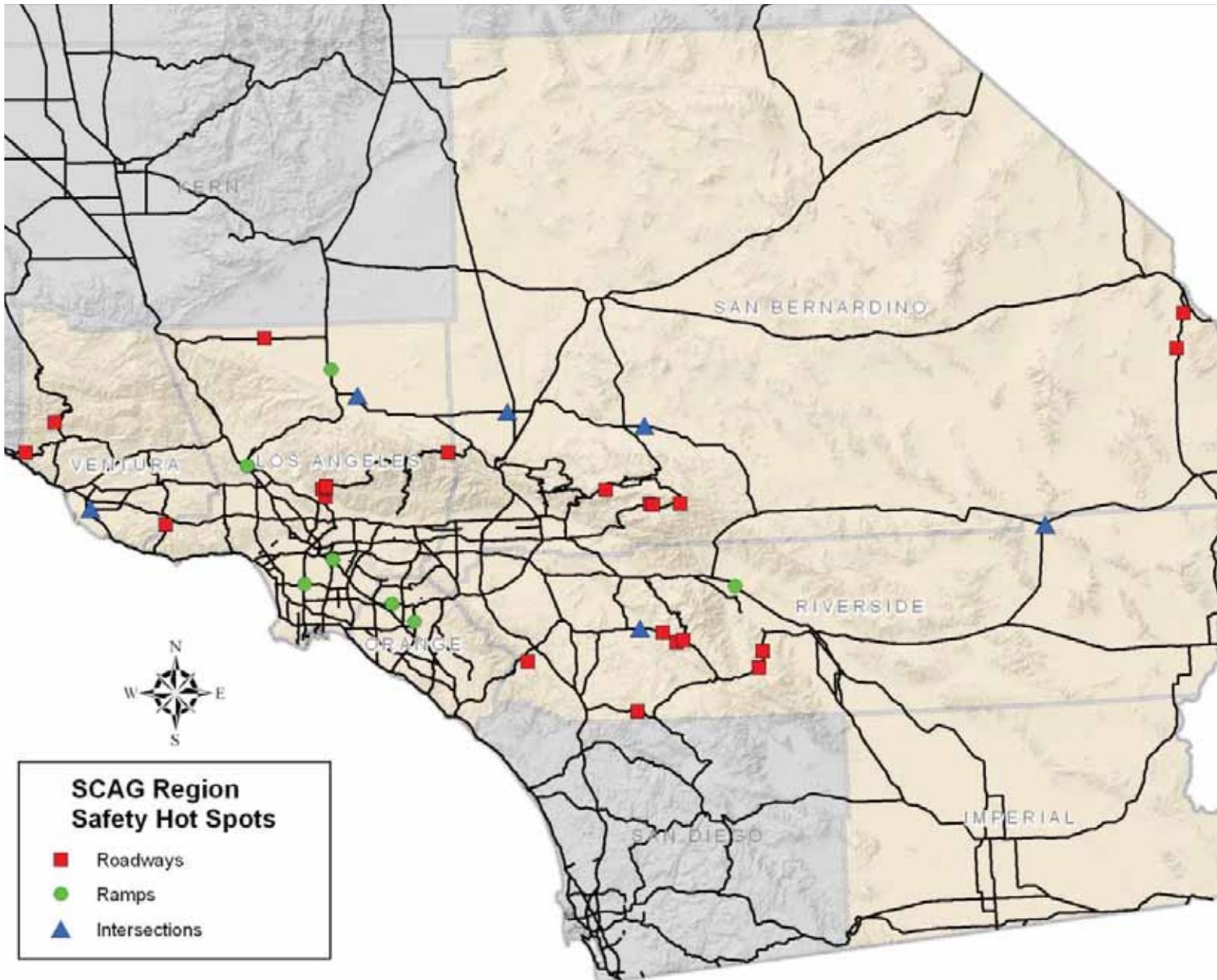
<sup>2</sup> <http://safety.fhwa.dot.gov/fivepercent/06ca.htm>

**TABLE 5 SCAG ROADWAY, INTERSECTION, AND RAMP LOCATIONS (STATE HIGHWAY SYSTEM ONLY)**

SCAG Roadway Locations (State Highway System only)			SCAG Intersection Locations (State Highway System only)		
County	Rte	Postmile	County	Rte	Postmile
Los Angeles	2	026.838 TO 027.038	Los Angeles	138	48.961 AVE R RT
Los Angeles	2	029.538 TO 029.738	Riverside	62	84.965 DESERT CTR-RICE-
Los Angeles	2	031.267 TO 031.467	Riverside	74	44.404 NEW CHICAGO AVE
Los Angeles	2	031.467 TO 031.667	San Bernardino	18	102.475 VERBENA RD - RT
Los Angeles	2	080.874 TO 081.074	San Bernardino	247	39.598 CAMP ROCK RD/EAST
Los Angeles	138	022.162 TO 022.362	Ventura	34	5.295 ROSE AVE
Riverside	74	010.313 TO 010.513			
Riverside	74	050.100 TO 050.300	SCAG Ramp Locations (State Highway System only)		
Riverside	74	056.780 TO 056.980	County	Rte	Postmile
Riverside	74	058.922 TO 059.122	Los Angeles	5	13.069 005/SB OFF TO
Riverside	74	083.193 TO 083.393	Los Angeles	14	R 25.056 014/SEG SB TO WELDON CYN RD
Riverside	74	089.695 TO 089.895	Los Angeles	14	R 25.095 014/SEG NBON FR SIERRA HWY
Riverside	79	006.389 TO 006.589	Los Angeles	14	R 65.886 014/SB OFF TO AVE L
San Bernardino	18	038.140 TO 038.340	Los Angeles	110	13.765 110/NB OFF TO TRANSIT STATION
San Bernardino	38	029.509 TO 029.709	Orange	55	13.921 055/SB OFF WB
San Bernardino	38	030.329 TO 030.529	Orange	91	3.268 091/SEG EB CONN FRONTAGE RD
San Bernardino	38	037.483 TO 037.683	Orange	91	3.502 091/SEG WB CONN FRONTAGE RD
San Bernardino	95	042.407 TO 042.607	Riverside	10	35.853 010/EB OFF TO GENE
San Bernardino	95	051.414 TO 051.614	San Bernardino	15	40.683 015/NB ON FR RTE
Ventura	23	000.940 TO 001.140			
Ventura	33	016.408 TO 016.608			
Ventura	150	001.599 TO 001.799			

Source: 2006 California Annual 5 Percent Report

**EXHIBIT 1 SCAG SAFETY HOT SPOTS**



Source: 2006 California Annual 5 Percent Report

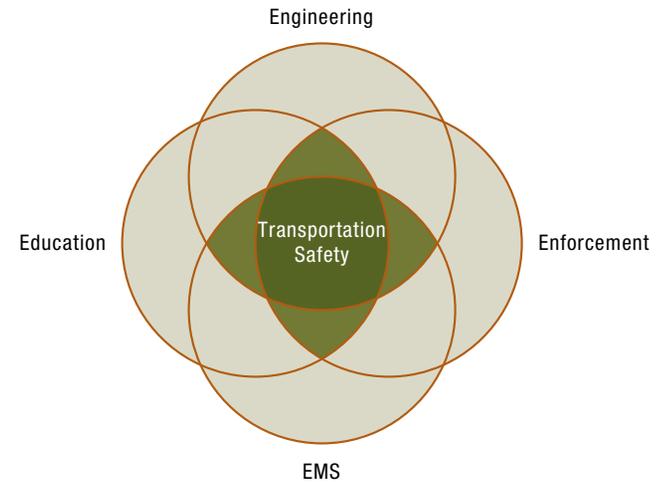
## CALIFORNIA STRATEGIC HIGHWAY SAFETY PLAN

In 2005, the Safe, Accountable, Flexible, Efficient Transportation Efficiency Act, A Legacy for Users (SAFETEA-LU) was passed. The legislation stated that each state should develop a Strategic Highway Safety Plan (SHSP) and that all metropolitan long range transportation plans should be consistent with the SHSP.

It is a logical progression from integrating safety into individual projects to coordinating safety utilizing not just engineering, but other methods in order to maximize transportation safety.

When addressing transportation safety, the four Es are frequently referenced to describe the multidisciplinary nature of transportation safety planning. The four Es are Engineering, Education, Emergency Medical Services (EMS), and Enforcement. The area in which planners have the most ability to effect change is likely to be engineering and the development of physical improvements to the transportation system.<sup>3</sup>

FIGURE 5 THE FOUR “E” ELEMENTS



Source: California Strategic Highway Safety Plan

However, a fifth E should be included. That E, called Evaluation, should monitor and review the effectiveness of the other four Es, allowing modifications where applicable.

<sup>3</sup> Transportation Planner's Safety Desk Reference, Report No. FHWA-HEP-07-005

The California draft SHSP lists 16 challenge areas designed to reduce accidents, fatalities and injuries. The 16 challenge areas and resultant strategies were developed during several workshops held by the California Department of Transportation (Caltrans) for various stakeholder agencies in both northern and southern California. SCAG participated in the workshops. Each Challenge Area contains the following elements:

1. Establishment of a goal for improving safety by 2010.
2. Background information on the Challenge Area including a history of fatalities from 1995 – 2004.
3. Strategies being considered for implementation to achieve the Challenge Area goal.
4. Institutional and other issues that could affect the success of the implementation.

Challenge 1: Reduce Impaired Driving Related Fatalities

Challenge 2: Reduce the Occurrence and Consequence of Leaving the Roadway and Head-on Collisions

Challenge 3: Ensure Drivers are Licensed and Competent

Challenge 4: Increase Use of Safety Belts and Child Safety Seats

Challenge 5: Improve Driver Decisions about Rights of Way and Turning

Challenge 6: Reduce Young Driver Fatalities

Challenge 7: Improve Intersection and Interchange Safety for Roadway Users

Challenge 8: Make Walking and Street Crossing Safer

Challenge 9: Improve Safety for Older Roadway Users

Challenge 10: Reduce Speeding and Aggressive Driving

Challenge 11: Improve Commercial Vehicle Safety

Challenge 12: Improve Motorcycle Safety

Challenge 13: Improve Bicycling Safety

Challenge 14: Enhance Work Zone Safety

Challenge 15: Improve Post Crash Survivability

Challenge 16: Improve Safety Data Collection, Access, and Analysis

It should be noted that Caltrans is developing implementation plans for each challenge area. The implementation plan will not be finalized until after this RTP is completed. There may also be some minor revisions to the strategies developed at the workshops.

Once the SHSP Implementation Plan is finalized, each strategy will have specific implementation steps that are prioritized based on potential effectiveness and cost.

SCAG, as a planning agency, can work with local agencies on incorporating some of the challenge areas into their project submissions. Projects outside of SCAG's purview can be supported through cooperation with local law enforcement, emergency service providers and education agencies as they address these safety challenges. Table 6 outlines SCAG's role in incorporating the SHSP into the RTP.

This report will focus on those areas within SCAG's designated role as a transportation planning agency. Data used in this section were collected by the SHSP Challenge Area Teams, and their conclusions are noted in italics.

In addition, Table 7 examines the overlapping of factors between each challenge area. For example, drunk driving was a factor in 7.8% of all intersection crashes, but intersections were a factor in 21% of all impaired driving fatalities.

**TABLE 6 SAFETEA-LU STATES THAT THE REGION'S PLANNING PROCESS SHOULD BE CONSISTENT WITH THE CALIFORNIA STRATEGIC HIGHWAY SAFETY PLAN**

SHSP Challenge Area	RTP Discussion	Regional Response
2. Reduce the Occurrence and Consequence of leaving the roadway and head-on collisions	In Safety Chapter	a) Identify projects that address safety in designated "hot spots" b) Encourage transportation projects that specifically enhance safety or complement education, enforcement or EMS for each challenge area. c) Request RTP project submissions identify the portion of the project that is applied to safety and/or challenge area, including funding.
5. Improve Driver Decisions about Rights of Way and Turning		
7. Improve Intersection and Interchange Safety for Roadway Users		
8. Make Walking and Street Crossing Safer		
9. Improve Safety for Older Roadway Users		
11. Improve Commercial Vehicle Safety		
13. Improve Bicycle Safety		
1. Reduce Impaired Driving Related Fatalities	Outside of SCAGs RTP role	d) Endorse Cooperation with State and local law enforcement, emergency response and education agencies as they address these transportation safety challenges. e) Work with the State and county transportation commissions to determine if various project submissions have potential benefit to safety in these challenge areas.
3. Ensure Drivers are Licensed and Competent		
4. Increase Use of Safety Belts and Child Safety Seats		
6. Reduce Young Driver Fatalities		
10. Reduce Speeding and Aggressive Driving		
12. Improve Motorcycle Safety		
14. Enhance Work Zone Safety		
15. Improve Post Crash Survivability		
16. Improve Safety Data Collection, Access and Analysis		

Source: SWITRS

**TABLE 7 OVERLAP FOR SHSIP CHALLENGE AREAS (INJURY COLLISIONS FOR SWITRS 2003-2005) (SEE NOTES BELOW FOR INTERPRETATION)**

Target area		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Area 1 – Reduce Impaired Driving Fatalities	N	70,691	17,166		9,806	5,579	12,029	14,845	5,460	3,803	6,524	2,533	2,773	2,541	834
	%	100.0	24.3		13.9	7.9	17.0	21.0	7.7	5.4	9.2	3.6	3.9	3.6	1.2
Area 2 – Reduce Leaving Roadway and head-on Coll.	N	17,166	78,929		9,142	20,158	19,508	19,072	1,726	7,664	11,090	2,761	4,219	1,910	597
	%	21.7	100.0		11.6	25.5	24.7	24.2	2.2	9.7	14.1	3.5	5.3	2.4	0.8
Area 3 – Ensure Licensed and Competent Drivers															

Target area		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Area 4 – Increase Safety belt and Child Safety Restraint Usage	N	9,806	9,142		36,960	8,644	9,349	9,325	401	3,045	8,301	3,087	895	684	469
	%	26.5	24.7		100.0	23.4	25.3	25.2	1.1	8.2	22.5	8.4	2.4	1.9	1.3
Area 5 – Improve Driver Decisions re: Rights of Way and Turning	N	5,579	20,158		8,644	110,295	26,962	10,703	2,269	10,024	0	8,858	7,194	4,677	1,625
	%	5.1	18.3		7.8	100.0	24.4	9.7	2.1	9.1	0.0	8.0	6.5	4.2	1.5
Area 6 – Reduce Young Driver Fatalities	N	12,029	19,508		9,349	26,962	147,860	49,376	8,220	10,417	47,810	4,231	4,137	6,870	1,765
	%	8.1	13.2		6.3	18.2	100.0	33.4	5.6	7.0	32.3	2.9	2.8	4.6	1.2
Area 7 – Improve Intersection and Interchange Safety	N	14,845	19,072		9,325	10,703	49,376	191,000	12,767	29,751	20,729	5,977	5,511	12,547	1,494
	%	7.8	10.0		4.9	5.6	25.9	100.0	6.7	15.6	10.9	3.1	2.9	6.6	0.8
Area 8 – Make Walking and Street Crossing Safer	N	5,460	1,726		401	2,269	8,220	12,767	40,857	7,564	2,460	1,149	109	126	304
	%	13.4	4.2		1.0	5.6	20.1	31.2	100.0	18.5	6.0	2.8	0.3	0.3	0.7
Area 9 – Improve Safety fir older Roadway Users	N	3,803	7,664		3,045	10,024	10,417	29,751	7,564	76,446	22,175	3,045	1,871	3,435	1,057
	%	5.0	10.0		4.0	13.1	13.6	38.9	9.9	100.0	29.0	4.0	2.4	4.5	1.4
Area 10 – Reduce Speeding and Aggressive Driving	N	6,524	11,090		8,301	0	47,810	20,729	2,460	22,175	191,746	10,394	8,857	1,880	3,696
	%	3.4	5.8		4.3	0.0	24.9	10.8	1.3	11.6	100.0	5.4	4.6	1.0	1.9
Area 11 – Improve Commercial Vehicle Safety	N	2,533	2,761		3,087	8,858	4,231	5,977	1,149	3,045	10,394	30,425	556	520	747
	%	8.3	9.1		10.1	29.1	13.9	19.6	3.8	10.0	34.2	100.0	1.8	1.7	2.5
Area 12 – Improve Motorcycle Safety	N	2,773	4,219		895	7,194	4,137	5,511	109	1,871	8,857	556	27,354	54	381
	%	10.1	15.4		3.3	26.3	15.1	20.1	0.4	6.8	32.4	2.0	100.0	0.2	1.4
Area 13 – Improve Bicycle Safety	N	2,541	1,910		684	4,677	6,870	12,547	126	3,435	1,880	520	54	32,196	223
	%	7.9	5.9		2.1	14.5	21.3	39.0	0.4	10.7	5.8	1.6	0.2	100.0	0.7
Area 14 – Enhance Work Zone Safety	N	834	597		469	1,625	1,765	1,494	304	1,057	3,696	747	381	223	7,974
	%	10.5	7.5		5.9	20.4	22.1	18.7	3.8	13.3	46.4	9.4	4.8	2.8	100.0
TOTAL	N	70,691	78,929		36,960	110,295	147,860	191,000	40,857	76,446	191,746	30,425	27,354	32,196	7,974

Source: David R. Ragland, Director, University of California Traffic Safety Center, University of California, Berkeley,

Table 7 suggests that intersection collisions represent greater than 18% overlap with ten of the 16 challenge areas, including:

Bicycle collisions	39.0%
Older Driver Collisions	38.9%
Young Driver Injury Collisions	33.4%
Pedestrian incidents	31.2%
Safety Belt/Child Safety Restraint usage	25.2%
Leaving the Roadway and head-on Collisions	24.2%
Impaired Driving	21.0%
Motorcycle Collisions	20.1%
Commercial Vehicle Collisions	19.6%
Work Zone Safety	18.7%

#### EXPLANATION OF THE TABLE

This table shows the overlap of all pairwise combinations of Challenge Areas that are defined by using SWITRS data (i.e., all areas except Area 3, 15, and 16). For Areas 3 and 15, no SWITRS data was available. Area 16 deals with overall data issues.

The table represents all injury collisions (fatal, severe, and minor combined). The table is set up so that Challenge Areas are represented by both rows and columns. The number in the cell represents the overlap, in absolute terms, and the % indicates the % of collisions in that Area that overlap with the Row target area. The blue-shaded cells are where the same areas intersect. The numbers in each row/column will not equal the total, as each causal factor can be represented in several different ways. As an example, a drunk driver may hit a pedestrian in an intersection. The single collision will be represented in Challenge areas 1, 7 and 8.

#### IMPLICATIONS

The set of Challenge Areas in California has a great deal of redundancy built in it. This is positive since it provides multiple ways to address the same collisions.

Success (or failure) in some areas will have major impacts on other areas.

Some sets of challenge areas might collaborate to mutual benefit.

#### CAVEATS

The table represents all injury collisions. Different patterns might emerge if we looked only at fatality or severe injury.

Note that this table only provides pair-wise combinations. A more complicated table would show that a large number of collisions are represented by three or even more Challenge Areas.

For example, drunk driving was a factor in 7.8% of all intersection crashes, but intersections were a factor in 21% of all impaired driving fatalities.

The various challenge areas have redundancy built in. A collision at an intersection may involve an impaired driver, a pedestrian, and an older driver. All would be represented in Table 7. This redundancy allows multiple mitigation methods that could prevent the same type of collision from happening in the future.

## CONSISTENCY WITH THE CALIFORNIA STRATEGIC HIGHWAY SAFETY PLAN

SCAG has no implementation authority, so can do little to enforce traffic laws, educate travelers, or provide EMS. What SCAG can do is work with the state and county transportation commissions to develop projects that promote the goals of the strategic highway safety plan, in conjunction with the enforcement, education and EMS goals.

### CHALLENGE 1: REDUCE IMPAIRED DRIVING RELATED FATALITIES

**Goal:** By 2010, reduce the number of roadway user fatalities attributed to alcohol and drug use by 15 percent from their 2004 level.

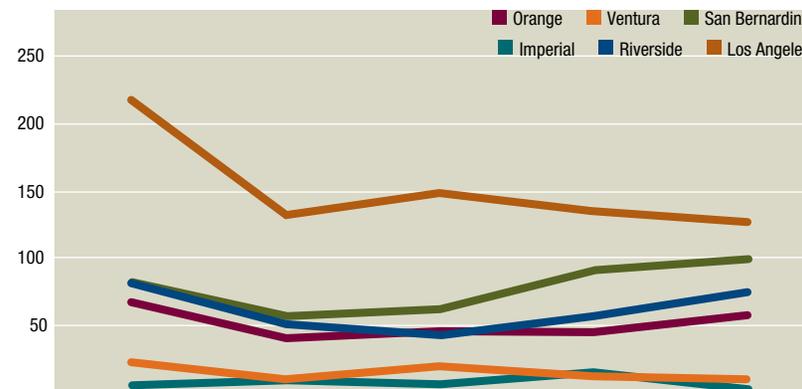
While the SCAG region has seen a decline in DUI/Drug collision fatalities, much of that can be attributed to a steep decline in Los Angeles County in 2002. Since 2002, the region, as a whole has increased each year from 298 deaths in 2002, to 371 deaths in 2005.

**TABLE 8 FATALITIES IN DUI COLLISIONS IN THE SCAG REGION (2001-2005)**

	2001	2002	2003	2004	2005
Imperial	8	9	6	14	4
Los Angeles	216	132	147	134	126
Orange	68	42	47	47	58
Riverside	82	50	43	56	75
San Bernardino	81	56	62	91	98
Ventura	22	9	19	11	10
SCAG	477	298	324	353	371
California	1,179	859	869	924	1,010
SCAG %	40.5%	34.7%	37.3%	38.2%	36.7%

Source: SWITRS

**FIGURE 6 FATALITIES IN DUI COLLISIONS IN THE SCAG REGION**



Source: SWITRS

There have been a greater number of DUI related injuries in the region, with 11,121 in 2001, declining to 10,661 in 2005. In relation to the State, the SCAG region represents less than 47%, but is higher than the fatality rate, which is 37 percent.

**TABLE 9 INJURIES IN DUI COLLISIONS IN THE SCAG REGION (2001-2005)**

	2001	2002	2003	2004	2005
Imperial	112	109	99	99	91
Los Angeles	6,146	5,157	5,277	5,343	5,405
Orange	1,508	1,491	1,474	1,628	1,605
Riverside	1,267	1,260	1,382	1,533	1,606
San Bernardino	1,507	1,368	1,340	1,406	1,411
Ventura	580	463	514	460	543
SCAG	11,120	9,848	10,086	10,469	10,661
California	25,344	22,383	22,064	22,760	22,824
SCAG % of California	43.9%	44.0%	45.7%	46.0%	46.7%

Source: SWITRS

The SHSP lists 10 strategies to reduce fatalities in this challenge area:

1. Educate roadway users regarding the dangers of impaired roadway use.
2. Restrict access to sources of alcohol/drugs for persons under 21 years of age, and for others as appropriate.
3. Enhance law enforcement training and the tools for detection of impaired roadway users.
4. Review effectiveness of existing sanctions as a deterrent to impaired driving.
5. Streamline and ensure consistent adjudication of arrested impaired drivers.
6. Improve the tracking of convicted impaired drivers.
7. Enhance the use of treatment programs to reduce recidivism of impaired drivers.
8. Increase and improve the application of administrative sanctions regarding impaired drivers.
9. Develop educational programs that combat the social acceptance of drinking and driving.
10. Develop new and innovative ways to approach repeat offenders.

While SCAG has an interest in reducing injuries and fatalities, SCAG has no implementation authority, particularly in relation to the 10 strategies. SCAG can support local jurisdictions and State authorities in their implementation of this Challenge.

## CHALLENGE 2: REDUCE THE OCCURRENCE AND CONSEQUENCE OF LEAVING THE ROADWAY AND HEAD-ON COLLISIONS

**Goal:** By 2010, reduce the number of fatalities attributed to vehicles leaving the roadway by 15 percent from their 2004 level.

“Within California, data shows that the number of fatalities from vehicles leaving the roadway and head-on collisions accounted for 34 percent of total fatalities from 2002 – 2004. Although lower than the national average, further safety improvements are possible. In order to reduce the fatalities and injuries resulting from vehicles leaving the road, efforts must be made to: (1) keep vehicles from leaving the road, (2) reduce the likelihood and severity of errant vehicles crashing into fixed objects, and (3) reduce the likelihood of errant vehicles overturning”.<sup>4</sup>

California intends to employ the following strategies to reduce the occurrence and consequence of leaving the roadway:

1. Keep vehicles on the roadway.
2. Minimize the consequences of leaving the roadway.
3. Reduce head-on collisions.
4. Apply advanced technology to reduce collisions.

### SCAG RESPONSE

Work with subregions and county transportation commissions to continue to incorporate into highway construction/reconstruction methods to warn drivers (such as rumble strips, “zot dots,” pavement markers, curve warning signs/beacons) they are leaving the highway or wandering into other lanes.

Support the continuing deployment of high visibility signage and road striping that enhance driver’s ability to notice, recognize and respond to warning signs during night time or periods of inclement weather.

<sup>4</sup> Draft California Strategic Highway Safety Plan.

### CHALLENGE 3: ENSURE DRIVERS ARE LICENSED AND COMPETENT

**Goal:** By 2010, reduce the number of fatalities attributed to drivers with no license, invalid license, or not licensed for class of vehicle by 15 percent from their 2004 level.

California intends to employ the following strategies to address the challenge of unlicensed and incompetent drivers:

1. Improve the initial licensing process.
2. Improve the competency of licensed California drivers.
3. Improve how California manages unlicensed drivers.
4. Improve how California manages drivers who operate vehicles with a suspended or revoked license.

While SCAG has an interest in reducing injuries and fatalities, SCAG has no implementation authority, particularly in relation to the above strategies. SCAG can support local jurisdictions and State authorities in their implementation of this Challenge.

### CHALLENGE 4: INCREASE USE OF SAFETY BELTS AND CHILD SAFETY SEATS

**Goal:** By 2010, increase statewide safety belt usage from the 2005 level of 92.5 percent to 95 percent, improve the use of child safety seats from 2005 level of 86.9 percent to 90.0 percent, and increase the percent of all vehicle occupant fatalities that are restrained to 70 percent.

The combination of air bags and lap and shoulder safety belts offers the most effective safety protection available for passenger vehicle occupants. California reports a 92.5 percent usage of safety belts in motor vehicles for 2005 – the seventh highest in the country.<sup>5</sup>

The SCAG region represents 40% of all occupant protection fatalities. Data collected as part of the SHSP indicate that young adults (ages 15-24 years are most at risk for fatalities and injuries. The primary collision factor (PCF) for a third of all occupant restraint related fatalities is “driving while under the influence” (DUI), with improper turning the second largest category for PCF.

As can be seen by Table 10 and Figure 7, the largest number of fatalities and injuries are among the newest drivers, aged 15-24, with the numbers tapering off after that as drivers gain more experience

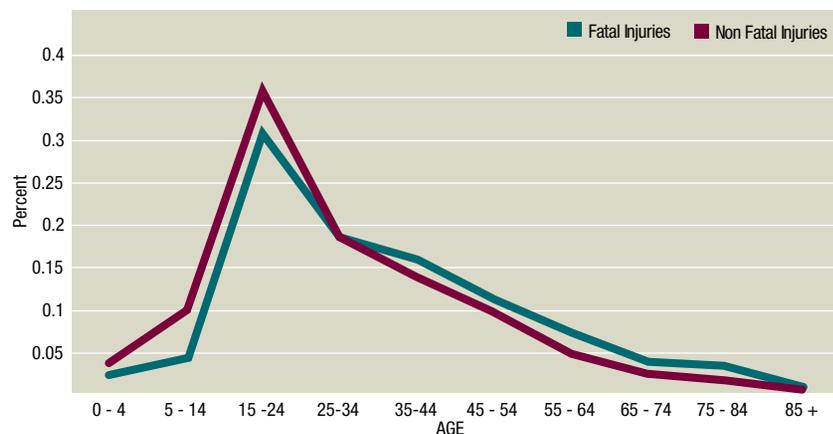
<sup>5</sup> NHTSA Seat Belt Use Rates 2005 - <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/RNotes/2005/809970.pdf>

**TABLE 10 OCCUPANT RESTRAINT NUMBER AND PERCENT OF INJURED AND FATAL INJURY COLLISIONS IN CALIFORNIA BY AGE (SWITRS 2003-2005)**

	?	0 - 4	5 - 14	15 - 24	25-34	35-44	45 - 54	55 - 64	65 - 74	75 - 84	85 +	Total
Injury		1664	4531	16322	8510	6310	4557	2087	1063	668	202	45914
Injury %		3.6%	9.9%	35.5%	18.5%	13.7%	9.9%	4.5%	2.3%	1.5%	0.4%	
Fatal	42	73	130	914	551	473	334	216	113	98	23	2967
Fatal %		2.5%	4.4%	30.8%	18.6%	15.9%	11.3%	7.3%	3.8%	3.3%	0.8%	

Source: SWITRS

**FIGURE 7 OCCUPANT RESTRAINT FATAL INJURIES AND NON-FATAL INJURIES BY PERCENT OF THE POPULATION BY AGE (SWITRS 2003-2005)**



Source: SWITRS

California intends to employ the following strategies to increase safety belt use and occupant protection:

1. Improve the availability, use, and proper installation of child restraint systems.
2. Target education and enforcement for demographic groups that show low safety belt usage rates.
3. Collect safety belt use information from first responders.
4. Increase education and enforcement on teen safety belt usage.

While SCAG has an interest in reducing injuries and fatalities, SCAG has no implementation authority, particularly in relation to the above strategies. SCAG can support local jurisdictions and State authorities in their implementation of this Challenge.

## CHALLENGE 5: IMPROVE DRIVER DECISIONS ABOUT RIGHTS OF WAY AND TURNING

**Goal:** By 2010, reduce the number of fatalities attributed to improper rights of way and turning decisions by 10 percent from their 2004 level.

The Challenge Area Team defined Rights of Way and Turning as the following:

RIGHT OF WAY is a driving concept that is fundamental to the most important decision that a driver makes. It is more commonly associated with decisions to cross or enter an intersection, but it also applies to maneuvers performed along a uni-directional flow of traffic (e.g. weaving, passing, merging and diverging).

IMPROPER TURNING is the primary collision factor (PCF) most often reported when vehicles traveling on highway segments (i.e. between access points) leave their lane, then the highway, and then crash along the roadside. UNSAFE LANE CHANGING - is also used to report collisions on highway segments, but with one difference: the offending vehicle collides with a vehicle in an adjacent or other lane before it can leave the highway. IMPROPER TURNING and UNSAFE LANE CHANGING are closely related, and can be mitigated with the same improvement strategies.

The Challenge Area Team developed the following hypotheses concerning the conditions causing improper Rights of Way and Turning decisions.

The two most prevalent operating conditions that occur on a regular (at least daily) basis at high collision locations include:

- a. A combination of high volumes and speeds
- b. A combination of unstable flow and speed differential between adjacent lanes; this condition is noteworthy because it is the primary source of abrupt or last second lane changing that appears to present a higher risk or potential for collisions than ordinary lane changing.

The most common physical (geometric) conditions or deficiencies at locations or segments with concentrated collisions are:

- c. Access points that meet, or violate the minimum spacing requirements (per Caltrans or AASHTO policy)
- d. Cross-sections of 8 or more lanes (4 or more lanes in one direction of travel)
- e. High ramp density due to closely spaced access points and multiple ramps serving single interchanges (due to high volumes seeking to enter or exit a freeway).

The most complex combination of geometrics, operational maneuvers and decision-making occurs along freeway corridors containing HOV lanes, especially when limited access design and operation is employed (the standard practice in Southern California). These facilities usually have the highest volume of traffic, the widest cross sections, a high level of recurrent and non-recurrent congestion, and left-side access openings between the HOV lane and adjacent freeway lanes that are superimposed over the existing right-side access ramps in a way that violates standard interchange spacing requirements...

Forty percent of the statewide collisions for this Challenge Area are located in the Los Angeles Basin - the area comprised of LA and Orange Counties, and parts of Ventura, Riverside and San Bernardino Counties. This area contains:

- the highest volume highways (freeways) in the state
- the most congested highways (freeways) in the state
- the most lane miles of HOV lane found anywhere in the state (or nation)
- the highest density of freeway access points in the state (especially where HOV access openings have been superimposed on the existing freeway system).

- the longest commutes in the state (in terms of both distance and duration)

Finally, it is important to recognize that millions of decisions related to operational maneuvers occur throughout the entire highway network on a daily basis, yet collisions are concentrated over a very small portion of the infrastructure, and only when a certain combination of conditions exist. This clearly suggests that the frequency of maneuvers is not by itself responsible for collision concentrations. In fact, the presence of specific geometric features (including deficiencies) and operating conditions are prerequisites for collision concentrations.

## STRATEGIES

California intends to employ the following strategies to reduce the number of fatalities attributed to improper rights of way and turning decisions:

1. Educate drivers on turning rules to support proper turning decisions.
2. Increase enforcement of drivers who make unsafe turns.
3. Employ traffic control devices, traffic calming, and speed-reduction design practices to reduce the likelihood and severity of crashes related to turning movements.
4. Improve roadway geometrics to restrict unsafe turns by motor vehicles.
5. Apply advanced technology to reduce collisions.

## SCAG RESPONSE

Support the use of traffic control devices, traffic calming, and speed-reduction design practices to reduce the likelihood and severity of crashes related to turning movements.

Support improved roadway geometrics to restrict unsafe turns by motor vehicles.

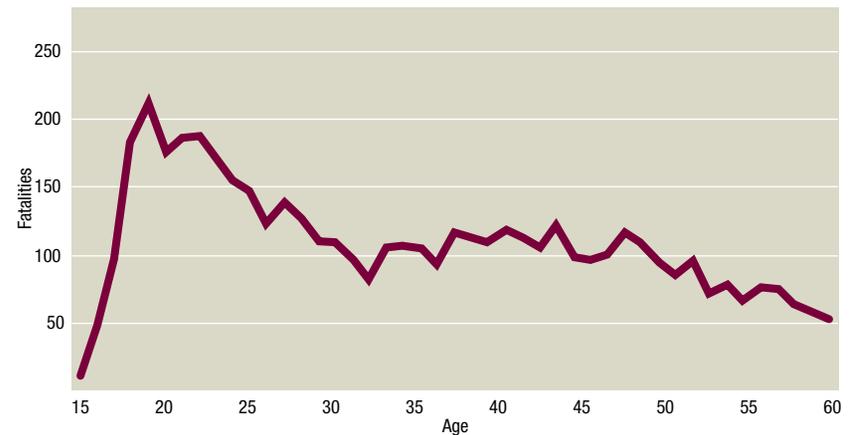
Support the use of advanced technology and ITS to reduce collisions.

## CHALLENGE 6: REDUCE YOUNG DRIVER FATALITIES

**Goal:** By 2010, reduce the number of fatalities attributed to drivers age 15 – 20 by 15 percent from their 2004 level.

Motor Vehicle accidents are the leading cause of death for young drivers. As the Figure 8 indicates, fatalities rapidly increase by age up until age 25, where they decline to levels normally associated with older, more experienced drivers.

**FIGURE 8 CALIFORNIA FATALITIES BY AGE (AGES 15-59) (2005)**



Source: SWITRS

## STRATEGIES

California intends to employ the following strategies to reduce young driver crashes:

1. Improve the education and behind the wheel training of young drivers.
2. Increase parental involvement, knowledge and buy-in to the graduated driver's license.
3. Improve the process of testing young drivers to obtain a driver's license.
4. Enforce compliance of young drivers with the graduated driver's license and rules of the road.
5. Enhance existing positive and constructive reinforcement of young driver behavior.
6. Enhance effective DUI countermeasures targeting drivers under age 21.

## SCAG RESPONSE

While SCAG has an interest in reducing injuries and fatalities, SCAG has no implementation authority, particularly in relation to the above strategies. SCAG can support local jurisdictions and State authorities in their implementation of this Challenge

However, it should be noted that younger drivers make up a significant portion of fatalities at intersections and interchanges (Challenge Area 7). It is anticipated that any improvements made to intersections and interchanges could have some benefit to reducing younger driving fatalities.

## CHALLENGE 7: IMPROVE INTERSECTION AND INTERCHANGE SAFETY FOR ROADWAY USERS

**Goal:** By 2010, reduce the number of intersection crash fatalities by 15 percent from their 2004 level.

Over 166,000 people were injured or killed at intersections in the SCAG region between 2003 and 2005 (an annual average of 55,333), representing nearly 22% of traffic fatalities and 35% of all traffic injury and fatality victims.

The Challenge Area Team noted that in California, on average, during 2003-2005, more than 97,000 people were injured or killed each year attempting to navigate the unique characteristics of roadways crossing another road or railroad tracks. There are several major aspects of the fatal intersection safety problem. Fatal collisions tended to:

- Occur on local roads (80%),
- Involve broadside collisions (64%), and/or
- Involve violations of traffic signals, stop signs, or another user's right of way (58%).

Collisions at intersections represent the greatest factor in a majority of the challenge areas. Pedestrians, young drivers, older drivers and impaired drivers each represent over 20% of fatalities and injuries at intersections.

**TABLE 11 INJURED VICTIMS BY COUNTY AND DEGREE OF INJURY AND PERCENT OF TOTAL (SWITRS 2003-2005)**

County	Fatal		Severe		Minor		Total (All Victims)	
	Area 7 Vic-tims	% of County Total	Area 7 Vic-tims	% of County Total	Area 7 Vic-tims	% of County Total	Area 7 Vic-tims	% of County Total
IMPERIAL	39	26.5%	61	19.4%	960	30.8%	1,060	29.6%
LOS ANGELES	585	25.3%	2,882	31.6%	102,684	39.5%	106,151	39.1%
ORANGE	151	23.8%	645	28.6%	22,455	32.6%	23,251	32.4%
RIVERSIDE	185	19.3%	539	22.2%	12,294	27.7%	13,018	27.2%
SAN BERNAR-DINO	189	15.9%	545	20.2%	14,702	30.3%	15,436	29.4%
VENTURA	44	20.0%	164	19.8%	6,906	36.1%	7,114	35.3%
SCAG Total	1,193	21.8%	4,836	27.4%	160,001	36.0%	166,030	35.5%
STATE Total	2,424	19.2%	9,663	24.3%	289,319	33.5%	301,406	32.9%

Source: SWITRS

Improving safety at intersections can have the greatest impact on decreasing impacts for most challenge areas in the SCAG region.

## STRATEGIES

The State of California intends to employ the following strategies to reduce intersection crashes:

1. Improve land use planning regarding impacts to intersections.
2. Educate the public on intersection safety and the rules of the road.
3. Increase enforcement at and near intersections.
4. Improve the visibility of and at intersections (illumination, marking and advanced warning).
5. Improve the design of traffic control devices.
6. Enhance the safety of rail-highway intersections.

7. Improve roadway design at intersections.
8. Reduce high risk rural road collisions.
9. Apply advanced technology to reduce collisions.
10. Improve design and operation of freeway interchanges.

## SCAG RESPONSE

As intersections are connection points for a variety of transportation modes (automobiles, pedestrians, motorcycles, commercial vehicles, etc...) they are also the locations for a significant number of collisions across all challenge areas.

Broadside collisions represent the greatest factor, with 64%, followed by violations of traffic signals.

SCAG is working with communities as part of the blueprint process in order to coordinate local land use with transportation. This process incorporates transit oriented development and walkable communities. This can include the promotion of safe intersection design, such as clearly marked crosswalks, “no right turn on red” signs at problem intersections.

- Incorporate intersection safety into the compass blueprint strategy.
- Incorporate ITS at high incident intersections to reduce red-light violations causing collisions.
- Encourage clearly marked, visible crosswalks
- Encourage the installation of improved visibility traffic signals as part of the normal traffic signal replacement cycle.
- Encourage development of median sanctuaries for pedestrians
- Support signalization at problem non-signalized intersections
- Encourage changing intersection geometries, where applicable. (offset intersection to aligned intersection, intersection to interchange, intersection to roundabout)

## CHALLENGE 8: MAKE WALKING AND STREET CROSSING SAFER

**Goal:** By 2010, reduce the number of pedestrian fatalities attributed to vehicle collisions by 25 percent from their 2000 level.

Over 7,600 pedestrians were injured or killed in the SCAG region in 2005. Los Angeles County, the most urbanized, has the highest number of killed and injured. In looking at percentages, Los Angeles County leads also (the lower absolute number of fatalities and injuries in Imperial County skews the data).

One goal of the draft 2007 California Strategic Highway Safety Plan is “By 2010, reduce the number of pedestrian fatalities attributed to vehicle collisions by 25 percent from their 2000 level.” The SCAG region had 349 pedestrian fatalities in 2000. That would entail reducing pedestrian fatalities to less than 280 by 2010.

The California SHSP Challenge Area Team examined available pedestrian fatality and injury data. The results of this data indicate:

- Although the State Highway System (SHS) accounts for only 10% of pedestrian injuries, it accounts for 29% of pedestrian fatalities.
- Although rural highways account for only 11% of pedestrian injuries, they account for 22% of pedestrian fatalities.
- The months of October through January have disproportionately high numbers of pedestrian injuries.
- Fridays and Saturdays have disproportionately high numbers of pedestrian fatalities and severe injuries.
- Although the bulk of walking trips take place during daylight hours, 60% of pedestrian fatalities occur during the hours of 7 PM to 7AM.
- Two-thirds of the pedestrian crash fatalities are male.
- Older pedestrians (55 and over) account for just 8% of pedestrian injuries, but 36% of pedestrian fatalities.

- Children 19 and under account for 34% of pedestrian injuries, yet only 13% of pedestrian fatalities.
- It is clear that pedestrian fatalities as a proportion of total fatalities are related to urbanicity...
- Urban areas tend to have higher pedestrian injury rates than expected based on population. Los Angeles County, for example, accounts for 39% of California’s pedestrian injuries, but only has 28% of California’s population. San Francisco accounts for 6% of California’s pedestrian injuries, but only has 2% of California’s population.
- Drivers in pedestrian crashes, like victims, are mostly male (63%)
- More pedestrian crash victims are Hispanic than any other race (38%).
- More pedestrian crash drivers are White than any other race (35%).
- 74% of pedestrian crash drivers had not been drinking.
- 75% of pedestrian crash victims had not been drinking.

## STRATEGIES

The California SHSP intends to employ the following overall strategies to reduce pedestrian fatalities:

1. Incorporate pedestrian safety into smart growth, land use planning, and other local plans.
2. Enhance the enforcement of violations of pedestrian law by pedestrians and motorists.
3. Educate all roadway users regarding the rights and responsibilities of pedestrians.
4. Promote and improve roadway safety infrastructure for pedestrians including the use of advanced technology.
5. Improve the visibility of pedestrians on the roadway.
6. Improve the safety of pedestrians traveling to and from schools.

7. Improve data collection and analysis regarding pedestrian trip characteristics, level of service, injuries and fatalities on California roadways.
8. Improve pedestrian safety expertise among transportation professionals and others involved in the design process.
9. Consider pedestrian needs in all roadway and transit projects.
10. Reduce vehicle speeds on urban thoroughfares and rural highways.

**TABLE 12 PEDESTRIAN FATALITIES AND INJURIES IN THE SCAG REGION (2005)**

COUNTY	Killed	Injured	Total Killed	Total Injured	Percent Killed	Percent Injured
Imperial Total	4	46	46	1,040	8.70%	4.42%
City Roads	3	36	4	406	75.00%	8.87%
Unincorporated Roads	1	10	42	634	2.38%	1.58%
Los Angeles Total	204	5,225	745	86,582	27.38%	6.03%
City Roads	187	4,841	626	78,973	29.87%	6.13%
Unincorporated Roads	17	384	119	7,609	14.29%	5.05%
Orange Total	53	827	205	23,028	25.85%	3.59%
City Roads	51	808	193	22,388	26.42%	3.61%
Unincorporated Roads	2	19	12	640	16.67%	2.97%
Riverside Total	48	425	333	15,966	14.41%	2.66%
City Roads	24	336	174	10,503	13.79%	3.20%
Unincorporated Roads	24	89	159	5,463	15.09%	1.63%
San Bernardino Total	54	526	425	16,929	12.71%	3.11%
City Roads	42	430	228	12,227	18.42%	3.52%
Unincorporated Roads	12	96	197	4,702	6.09%	2.04%
Ventura Total	10	216	71	6,266	14.08%	3.45%
City Roads	5	204	38	5,291	13.16%	3.86%
Unincorporated Roads	5	12	33	975	15.15%	1.23%
SCAG Total	373	7,265	1,825	149,811	20.44%	4.85%
City Roads	312	6,655	1,263	129,788	24.70%	5.13%
Unincorporated Roads	61	610	562	20,023	10.85%	3.05%
Statewide Total	748	13,556	4,304	292,798	17.38%	4.63%

Source: SWITRS

## SCAG RESPONSE

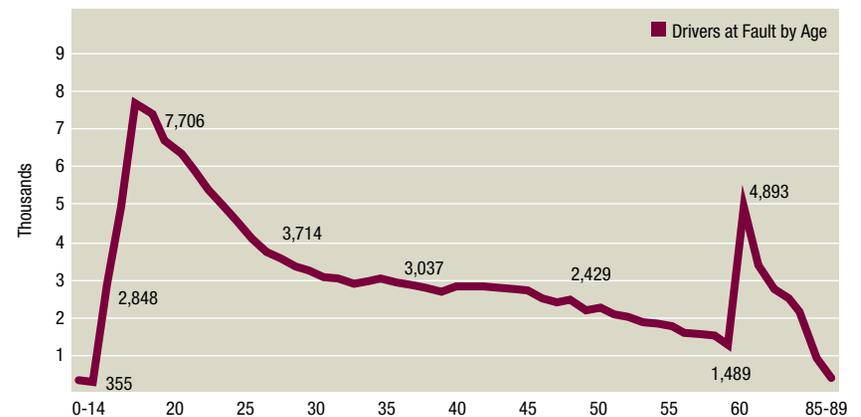
- Encourage cities and counties to integrate pedestrian safety into general & specific plans, non-motorized transportation plans and other land use policy documents
- Encourage the development of Pedestrian Safety Action Plans in all urban & rural communities
- Incorporate applicable Complete Streets policies – providing safe access for all modes – as fundamental principles of transportation plans
- Encourage safe, convenient, high visibility pedestrian crossings at mid-block and intersection locations on urban thoroughfares and rural highways.
- Encourage clearly marked, visible crosswalks at intersections and mid-blocked locations
- Encourage the use of advanced signalization at intersections
- Encourage pedestrian and bicycle safety in all maintenance projects where new striping will be required or existing striping is to be replaced

## CHALLENGE 9 : IMPROVE SAFETY FOR OLDER ROADWAY USERS

**Goal:** By 2010, reduce the number of fatalities attributed to drivers age 65 and older by 10 percent from their 2004 level.

Older drivers tend to self regulate, driving less, avoiding rush hour and night time driving unless necessary. However, that means that older drivers are over represented when taking into account vehicle miles traveled. In addition, the frailty associated with advancing years means that older drivers are more likely to succumb to injuries in a minor collision than a younger person.

**FIGURE 9 AT FAULT DRIVERS IN FATAL AND INJURY COLLISIONS BY AGE (2005)**



Source: SWITRS

Intersections pose a particular safety problem for older drivers. Navigating through intersections requires the ability to make rapid decisions, react quickly, and accurately judge speed and distance. As these abilities can diminish through aging, older drivers have more difficulties at intersections and are more likely to be involved in a fatal crash at these locations. Research shows

that 37 percent of traffic-related fatalities involving drivers aged 65 and older occur at intersections compared with 18 percent for drivers aged 26 to 64<sup>6</sup>.

“Failure-to-yield crashes occurred most often when drivers were turning left and occurred more frequently at stop signs than at signalized intersections. One reason was because failure-to-yield crashes at traffic signals were coded only for drivers turning left or right (going straight through a red light was coded as ran traffic control), whereas failure-to-yield crashes at stop signs were coded for drivers traveling straight as well as turning left or right. However, even among failure-to-yield crashes when drivers were turning left or right, a greater percentage occurred at stop signs (45 percent) than at signalized intersections (29 percent)...”

“...Compared with drivers of other ages, drivers ages 70-79 made more evaluation errors in failure-to-yield crashes, and these errors generally occurred when drivers saw the other vehicles but misjudged whether there was enough time to proceed.”<sup>7</sup>

This may occur because of the level of cooperation needed at unsignalized intersections. At signalized intersections, the light dictates who moves. At stop signs there is greater interaction within the intersection proper. Some drivers enter the intersection “out of order” or come close to other cars already in the intersection “Among the oldest drivers, failure to see other vehicles may be due to age-related declines in visual ability or decreased ability to process multiple sources of information simultaneously.” At “two way stop” intersections, the problems include, determining two-way or four-way stop, and assessing speed of non-stopping cars.

Recognizing that intersections are particularly problematic for older drivers, the FHWA’s top priority in its Highway Design Handbook for Older Drivers and Pedestrians is intersection improvements. Practices to improve older drivers’ ability to navigate intersections include using bigger signs with larger

<sup>6</sup> Older Driver Safety - Knowledge Sharing should help states Prepare for Increase in Older Driver Population, (GAO-07-413)

<sup>7</sup> Older Driver Safety: Knowledge Sharing Should Help States Prepare for Increase in Older Driver Population (GAO-07-413)

lettering to identify street names, consistent placement of lane use signs and arrow pavement markings, aligning lanes to improve drivers’ ability to see oncoming traffic, and using reflective markers on medians and island curbs at intersections to make them easier to see at night. In addition, FHWA is considering changes to its Manual on Uniform Traffic Control Devices—to be published in 2009—that will enhance older driver safety by updating standards related to sign legibility and traffic signal visibility.

## STRATEGIES

California intends to employ the following strategies to reduce older driver crashes:

1. Improve driver licensing testing and assessment procedures to more accurately reflect behind-the-wheel capabilities.
2. Create and promote wellness and behavioral strategies for older persons, making it possible for them to drive safely for added years.
3. Enhance law enforcement training to recognize older driver behaviors that may necessitate priority drivers license re-examinations, and provide law enforcement with a broader understanding of older driver sensitivities.
4. Develop public education materials, programs and tactics that clearly explain how the aging process affects driving and what families, friends and the public can do to help seniors (1) drive for more years safely and (2) transition comfortably to alternate forms of transportation when driving ceases.
5. Explain and encourage older persons’ self-assessment of driving abilities and how to take advantage of that information to make appropriate decisions about driving.
6. Seek the cooperation and coordination of the transit (bus, light rail, etc.) community to make these transportation options more accommodating and practical for older persons who can no longer drive.

7. Implement advancements in highway lighting, striping, signing and engineering practices to make the highway environment safer for older drivers.
8. Leverage the programs and resources of the Older Californian Traffic Safety Task Force to help with accomplishment of stated objectives.
9. Promote the establishment and enhanced capacity of occupational therapy driving evaluation and rehabilitation programs that serve seniors.
10. Improve the ability of health care professionals to provide effective assessment, counseling, and remediation to improve safe mobility of seniors.

### SCAG RESPONSE

- Support JARC/New Freedom, paratransit to include those over 65 years of age.
- Support roadway, intersection and interchange improvements that support improving rights of way decision by older drivers.
- Encourage formation and expanded use of Supplemental Transportation Systems (STPs), particularly in locations where standard public transit is sparse or unavailable.
- Support signage and striping that enhance driver’s ability to notice, recognize and respond to warning signs during night time and/or inclement weather conditions.

### CHALLENGE 10 : REDUCE SPEEDING AND AGGRESSIVE DRIVING

Goal: By 2010, reduce the number of fatalities attributed to speeding and other forms of aggressive driving by 15 percent from their 2004 level.

The SHSP Challenge Area Team performed a review of the statistics from SWTRS reports between 2003 and 2005. The results indicate a number of trends in California:

The five counties having the highest number of aggressive driving fatalities in the State are: Los Angeles (25.1%), San Diego (9.5%), San Bernardino (7.6%), Riverside (7.1%) and Orange (4.8%).

Statistics show percent of accidents resulting in a fatality based on the at fault driver:

Gender	Male (78%) to Female (22%)
Age:	15 to 24 at 34%
	25 to 34 at 21%
	35 to 44 at 16%
Day	Weekends (Friday to Sunday) at 53%
Time	Between 9:00 pm and 1:00 am at 17%
Urban/Rural	Urban at 60% with Rural at 40%
<p>Ninety-eight percent of aggressive driving fatalities occurred based on a primary collision factor of Unsafe Speed. Based on Unsafe Speed and Following Too Close, three collision types presented as the most common: Hit Object (34%), Rear End (25%) and overturned (12%).</p>	

## STRATEGIES

California intends to employ the following strategies to reduce speeding and aggressive driving collisions.

The SHSP Implementation Plan will present specific action items to implement these strategies:

1. Change our social norms to reduce the acceptability of speeding and other forms of aggressive driving.
2. Provide targeted enforcement to locations prone to speeding and other forms of and aggressive driving.
3. Employ engineering methods to deter speeding and other forms of aggressive driving (e.g. traffic calming).
4. Ensure consistent adjudication of drivers cited for speeding and other forms of aggressive driving.
5. Apply advanced technology to reduce collisions.
6. Reduce the presence of speeding, unsafe and aggressive driving on the television and in movies.

## SCAG RESPONSE

Work with the State and county transportation commissions to determine if various project submissions have potential benefit to safety in this challenge area.

## CHALLENGE 11 : IMPROVE COMMERCIAL VEHICLE SAFETY

**Goal:** By 2010, reduce the number of commercial vehicle crash fatalities by 10 percent from their 2004 level.

There were 17,085 truck-involved collisions in SCAG region in 2005. Less than one percent or 126 of the collisions were fatal, 24.8 percent caused injury, and 74.5 percent were property-damage-only collisions.

Commercial Vehicle Safety is critical to the SCAG region. The region hosts three ports that represent a significant amount of cargo coming into the nation. In addition, agriculture, particularly in Imperial and Ventura counties represent time-critical commercial transportation.

As indicated in Table 13. Imperial County has the highest fatal truck-involved collision rate (1.8 percent, followed by San Bernardino (1.2 percent) and Riverside (1.1 percent). Ventura County has the lowest (0.4 percent). Table 14 indicates the historical fatal collision rate since 1996, while Table 15 indicates the historical injury collision rate.

**TABLE 13 TYPES OF TRUCK INVOLVED COLLISIONS IN THE SCAG REGION (2005)**

County Region State	Fatal		Injury		Property Damage Only		Total	
	Collisions	Percent	Collisions	Percent	Collisions	Percent	Collisions	Percent
Imperial	3	1.8%	47	28.7%	114	69.5%	164	100%
Los Angeles	50	0.5%	2,229	23.8%	7,077	75.6%	9,356	100%
Orange	15	0.7%	531	24.6%	1,609	74.7%	2,155	100%
Riverside	22	1.1%	571	27.3%	1,495	71.6%	2,088	100%
San Bernardino	34	1.2%	721	25.6%	2,065	73.2%	2,820	100%
Ventura	2	0.4%	134	26.7%	366	72.9%	502	100%
SCAG Region	126	0.7%	4,233	24.8%	12,726	74.5%	17,085	100%
CA, Excluding SCAG Region	217	1.5%	3,577	25.0%	10,537	73.5%	14,331	100%
California	343	1.1%	7,810	24.9%	23,263	74.0%	31,416	100%

Source: SWITRS

**TABLE 14 FATAL TRUCK COLLISIONS BY COUNTY (1996-2005)**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COUNTY										
Imperial	4	5	8	5	8	9	3	6	8	3
Los Angeles	65	70	54	48	63	72	55	56	60	50
Orange	10	16	10	15	9	14	12	14	15	15
Riverside	21	25	28	27	25	20	21	28	30	22
San Bernardino	29	36	32	36	34	27	28	29	36	34
Ventura	6	7	6	3	4	5	7	8	6	2
SCAG	135	159	138	134	143	147	126	142	155	126
CA Total	373	364	343	334	366	362	345	339	342	343
SCAG %	36%	44%	40%	40%	39%	41%	37%	42%	45%	37%

Source: SWITRS

The SCAG region represented 53.4% of the State's 7,810 truck collisions that involved a fatality or injury in 2005. Of the 7,810 truck involved collisions in the State, 3,570, or 46% had truck drivers at fault.

Table 16 represents the top twenty highways in the SCAG region for Truck involved collisions. The most common type of truck-involved collisions was side-wipe, followed by rear end. They represent 43 percent of truck-involved collisions in SCAG region in 2005, as represented by Table 17. Most of truck-involved collisions in SCAG region occurred on state highways (57 percent in total), 9 percent occurred on ramps. It is likely that the difficult maneuvers of big trucks near highway ramps tend to cause traffic collisions, as indicated by Table 18.

**TABLE 15 INJURY TRUCK COLLISIONS BY COUNTY (1996-2005)**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
COUNTY										
Imperial	61	63	71	57	43	55	42	54	50	46
Los Angeles	2520	2375	2307	2428	2446	2511	2344	2338	2087	2210
Orange	524	544	563	537	560	487	449	461	497	524
Riverside	337	370	404	412	429	441	455	544	562	558
San Bernardino	614	614	626	693	633	692	679	755	781	703
Ventura	134	166	141	136	143	155	166	151	124	133
SCAG	4190	4132	4112	4263	4254	4341	4135	4303	4101	4174
CA Total	8348	8421	8447	8623	8695	8729	8230	8241	7949	7810
SCAG %	50%	49%	49%	49%	49%	50%	50%	52%	52%	53%

Source: SWITRS

**TABLE 16 TOP TWENTY HIGHWAYS WITH MOST TRUCK-INVOLVED COLLISIONS (2005)**

Rank	Primary Road	Collisions	Percent
1	RT 10	1,571	9.2%
2	RT 5	1,548	9.1%
3	RT 15	946	5.5%
4	RT 60	938	5.5%
5	RT 405	725	4.2%
6	RT 91	725	4.2%
7	RT 101	549	3.2%
8	RT 710	545	3.2%
9	RT 215	432	2.5%
10	RT 210	420	2.5%
11	RT 605	418	2.4%
12	RT 57	305	1.8%
13	RT 110	262	1.5%
14	RT 118	145	0.8%
15	RT 14	142	0.8%
16	RT 105	127	0.7%
17	RT 40	106	0.6%
18	RT 55	95	0.6%
19	RT 22	91	0.5%
20	RT 134	85	0.5%
Top 20 Routes Total		10,175	60%
Grand Total		17,085	100%

Source: SWITRS

**TABLE 17 TYPE OF TRUCK-INVOLVED COLLISIONS (2005)**

Type of Collision	Collisions	Percent
Sidewipe	7,314	43%
Rear End	5,175	30%
Hit Object	1,747	10%
Broadside	1,706	10%
Overtaken	365	2%
Head-On	265	2%
Vehicle/Pedestrian	60	0.4%
Other	453	3%
Total	17,085	100%

Source: SWITRS

**TABLE 18 TRUCK-INVOLVED COLLISIONS BY LOCATION TYPE**

Location Type	Collisions	Percent
State Highway		
Highway	9,706	57%
Ramp	1,453	9%
Intersection	199	1%
Not State Highway	5,717	33%
Total	17,085	100%

Source: SWITRS

Tables 19 and 20 detail the locations in order of frequency in the SCAG Region. The top locations on state highways and the top five locations on city/county roadways have been identified by the highest number of collisions, per year. It should be noted that the vast majority of accident locations within California are located in the SCAG region. The top 14 locations for Highway and Non-State Locations of commercial vehicle accidents are in the SCAG region.

**TABLE 19 HIGHWAY AND NON-STATE LOCATIONS IN SCAG REGION WHERE A COMMERCIAL TRUCK WAS INVOLVED IN AN INJURY ACCIDENT (2005)**

Highway	City/County	Secondary Route	Collisions
Rte 60	Diamond Bar/LA	Grand Ave	162
Rte 605	Unincorporated/LA	Route 60	113
Rte 15	Unincorporated/SB	Route 138	109
Rte 10	Ontario / SB	Milikin Ave	109
Rte 15	Unincorporated/SB	Kenwood Ave	102
Rte 605	Baldwin Park/LA	Route 10	96
Rte 605	Santa Fe Springs/LA	Telegraph Road	95
Rte 91	Anaheim/Orange	Imperial Highway	93
Rte 91	Anaheim/Orange	Lakeview Ave	89
Rte 10	Unincorporated/SB	Cedar Ave	89
Rte 91	Anaheim/Orange	Weir Canyon Rd	87
Rte 405	Los Angeles/LA	Sepulveda Blvd	84
Rte 10	Ontario / SB	Rte 15	83
Rte 215	Riverside/Riverside	Blaine St.	76
Roadway	City/County	Secondary Route	Collisions
Valley Blvd	Unincorporated/SB	Cedar Ave	36
Castaic Rd	Unincorporated/LA	Lake Hughes Rd	20
Van Buren Blvd	Unincorporated/Riverside	Washington St.	19

Source: SWITRS

**TABLE 20 HIGHWAY AND NON-STATE HIGHWAY LOCATIONS IN THE SCAG REGION WHERE A COMMERCIAL TRUCK INVOLVED IN AN INJURY ACCIDENT WAS AT FAULT (2005)**

Highway	City/County	Secondary Route	Collisions
Rte 60	Diamond Bar/LA	Grand Ave	86
Rte 10	Ontario / SB	Milikin Ave	75
Rte 15	Unincorporated/SB	Kenwood Ave	62
Rte 15	Unincorporated/SB	Route 138	61
Rte 605	Unincorporated/LA	Route 60	60
Rte 91	Anaheim/Orange	Imperial Highway	52
Rte 405	Los Angeles/LA	Sepulveda Blvd	51
Rte 605	Baldwin Park/LA	Route 10	50
Rte 605	Santa Fe Springs/LA	Telegraph Road	50
Rte 215	Riverside/Riverside	Blaine St.	47
Rte 605	Unincorporated/LA	Valley Blvd	46
Rte 405	Unincorporated/LA	Wilshire Blvd	44
Rte 91	Anaheim/Orange	Weir Canyon Rd	43
Rte 10	Ontario / SB	Rte 15	42
Roadway	City/County	Secondary Route	Collisions
Valley Blvd	Unincorporated/SB	Cedar Ave	16
Castaic Rd	Unincorporated/LA	Lake Hughes Rd	14
Van Buren Blvd	Unincorporated/Riverside	Etiwanda Ave	12

Source: SWITRS

As indicated in Table 21, unsafe speed, unsafe lane change, and improper lane change are the top three factors causing truck-involved collisions. Combined together, they represent 70 percent of all truck involved collisions in SCAG region in 2005.

**TABLE 21 CONTRIBUTING FACTORS OF ALL TRUCK-INVOLVED COLLISIONS IN THE SCAG REGION (2005)**

Violation Category	Collisions	Percent
Unsafe Speed	4,417	25.9
Unsafe Lane Change	4,186	24.5
Improper Turning	3,305	19.3
Other Than Driver (or Pedestrian)	821	4.8
Automobile Right of Way	740	4.3
Improper Passing	477	2.8
Driving Under the Influence of Alcohol or Drug	459	2.7
Other Hazardous Violation	443	2.6
Other Equipment	348	2.0
Traffic Signals and Signs	335	2.0
Following Too Closely	253	1.5
Wrong Side of Road	228	1.3
Other Improper Driving	122	0.7
Brakes	94	0.6
Pedestrian Violation	32	0.2
Hazardous Parking	27	0.2
Impeding Traffic	20	0.1
Lights	15	0.1
Pedestrian Right of Way	8	0.05
Fell Asleep	5	0.03
Not Stated	228	1.3
Unknown	522	3.1
Total	17,085	100

Source: SWITRS

Most of truck-involved collisions in SCAG region occurred on state highways (67 percent in total), 9 percent occurred on ramps. It is likely that the difficult maneuvers of big trucks near highway ramps tend to be a factor in traffic collisions.

Unsafe speed, unsafe lane change, and improper lane change are the top three factors causing truck-involved collisions. Combined together, they represent 70 percent of all truck involved collisions in SCAG region in 2005

## STRATEGIES

California intends to employ the following strategies to reduce the number of fatalities attributed to commercial vehicle collisions. The SHSP Implementation Plan will present specific action items to implement these strategies:

1. Educate the public on commercial vehicle safety.
2. Improve the training, testing, and licensing of commercial vehicle drivers.
3. Increase the enforcement of commercial vehicle and operator violations.
4. Improve commercial vehicle maintenance.
5. Increase the use of commercial vehicle safety equipment.
6. Improve commercial vehicle drivers' detection of other roadway users.
7. Improve infrastructure for commercial roadway drivers.
8. Improve commercial vehicle safety design.
9. Apply advanced technology to reduce collisions.

**TABLE 22 INJURY COLLISIONS\* IN CALIFORNIA WHERE TRUCK DRIVER WAS AT FAULT BY AGE BY PRIMARY COLLISION FACTOR (2005)**

Primary Collision Factor	AGE												Not Stated	TOTAL
	0-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	≥65		
Unsafe Speed		23	114	166	161	233	236	199	145	98	51	28	43	1,497
Improper Turning	1	8	45	69	52	68	87	64	62	31	19	15	24	545
Unsafe Lane Change		6	27	40	53	46	64	60	44	35	22	9	114	520
Automobile Right-Of-Way		5	18	37	38	49	57	36	32	24	12	20	10	338
Traffic Signals And Signs		8	15	14	8	16	20	13	12	4	6	3	4	123
Unsafe Starting Or Backing		1	9	14	15	15	14	18	5	11	4	4	4	114
Following Too Closely		3	8	15	18	16	13	9	14	7	5	4	1	113
Wrong Side Of Road		3	5	3	9	11	9	11	12	2	4	6	6	81
Other Hazardous Violation			2	5	5	10	9	5	5	5	1	2	11	60
Influence Of Alcohol Or Drug		1	3	4	7	4	8	5	2	4	2	1		41
Not Stated		1	4	6	5	5	3	4	2	2	2		3	37
Other Equipment				2	4	8	6	4	2	1		1	2	30
Improper Passing				4	2	5	5	2	2	2	2		5	29
Pedestrian Right-Of-Way			2		3	2	2	2	1	1	1		2	16
Other Improper Driving			1			3	2	2	1				3	12
Brakes				3		2	3		1	2				11
Hazardous Parking					1	1		1	1				2	6
Impeding Traffic									1					1
Pedestrian Violation		1												1
Unknown								1						1
<b>TOTAL</b>	<b>1</b>	<b>60</b>	<b>253</b>	<b>382</b>	<b>381</b>	<b>494</b>	<b>538</b>	<b>436</b>	<b>344</b>	<b>229</b>	<b>131</b>	<b>93</b>	<b>234</b>	<b>3,576</b>

Source: SWITRS

## SCAG RESPONSE

- Support the use of dedicated truck capacity on corridors with significant truck traffic in order to separate commercial vehicles from passenger vehicles.
- Support the continued modernization of intersections and interchanges prone to high commercial vehicle collisions to promote safety
- Support the use of truck climbing lanes as a method to segregate commercial vehicles from passenger vehicles.

## CHALLENGE 12 : IMPROVE MOTORCYCLE SAFETY

**Goal:** By 2010, reduce the number of motorcycle rider fatalities by 10 percent from their 2004 level.

In 2005 in the SCAG region, there were over 3,649 motorcycle collisions, of which 172 were fatal. That represents just over 40% of the State fatalities and injuries.

Despite the fact motorcycles represent 2.1 percent of all vehicles registered in California, motorcyclists are involved in 10.8 percent of all fatal traffic collisions. Within the SCAG region, motorcycles are involved in 4.5 percent of all fatal traffic collisions. Fatal and Injury Motorcycle collisions in the SCAG region are indicated in Table 23.

**TABLE 23 FATAL AND INJURY MOTORCYCLE COLLISIONS BY COUNTY (2001-2005)**

COUNTY	2001		2002		YEAR 2003*		2004*		2005*	
	Fatal	Injury	Fatal	Injury	Fatal	Injury	Fatal	Injury	Fatal	Injury
Imperial	1	19	1	12	1	26		15	2	15
Los Angeles	58	1,701	62	1,866	78	2,167	70	1,996	74	1,928
Orange	24	425	16	505	21	601	27	532	29	630
Riverside	16	335	24	389	25	458	16	458	25	433
San Bernardino	15	335	22	396	26	390	27	472	32	453
Ventura	4	170	6	200	13	254	9	231	10	190
SCAG Region	118	2,985	131	3,368	164	3,896	149	3,704	172	3,649
CA Total	289	7,920	320	8,406	369	9,254	352	9,056	411	9,061
SCAG %	40.8%	37.7%	40.9%	40.1%	44.4%	42.1%	42.3%	40.9%	41.9%	40.3%

Source: SWITRS

In researching the data for this challenge area, the Challenge Area Team determined that:

Several groups of riders are overrepresented compared to their presence in the motorcycle riding population. For example, riders from 15-24 are a small percentage of the owners (4-6%) yet represent nearly twice that percentage of fatalities (11-13%). A second group of riders that are overrepresented according to their presence in the population is riders over 55. It should also be noted that 90% of the fatal victims are male.<sup>8</sup>

The primary collision factor for 59% of the motorcycle collisions were attributed to three factors: driving under the influence (DUI) of alcohol and/or drugs, unsafe speed, and improper turning. CHP data shows that of the motorcycle-involved collisions, 65% of the fatal and 56% of the injury collisions were the fault of the motorcyclist.

- Alcohol impairment is a substantial problem for motorcyclists, more so than for drivers of other motor vehicles.<sup>9</sup>
- Unsafe speed and improper turning indicate a need for an emphasis on rider education and training.
- Licensing (written/practical testing) and training standards for motorcyclists are lower than for drivers of passenger vehicles despite the fact riding a motorcycle requires higher levels of both vehicle control and cognitive skills.

It is noted in Table 24 that the greatest primary collision factor with motorcycle collisions is unsafe speed. Also noted in the table is that the 20-24 age group is significantly higher in collisions with a primary collision factor of unsafe speed. Younger motorcycle drivers have the highest number of collisions in 12 primary collision factors.

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<sup>8</sup> David Ragland

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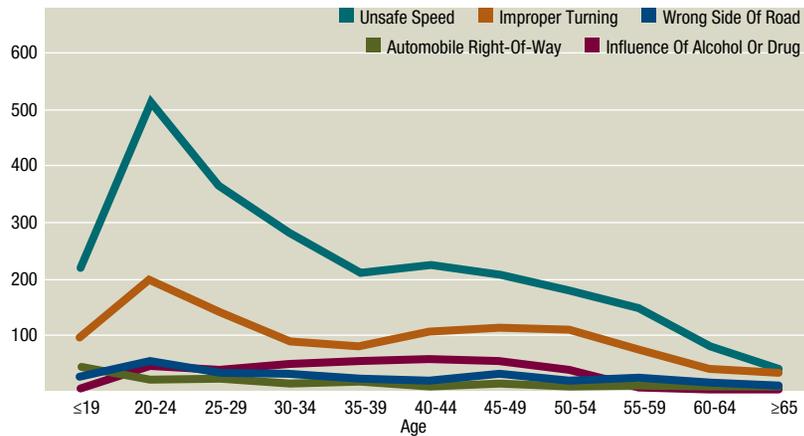
<sup>9</sup> Countermeasures That Work: Highway Safety Countermeasure Guide For State Highway Safety Offices, NHTSA Nationwide

**TABLE 24 INJURY COLLISIONS IN CALIFORNIA WHERE MOTORCYCLE DRIVER WAS AT FAULT BY AGE BY PRIMARY COLLISION FACTOR (2005)**

	≤19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	≥65	?	TOTAL
Primary Collision Factor													
Unsafe Speed	219	511	361	282	213	227	209	180	151	81	43	19	2,496
Improper Turning	96	199	141	87	80	103	113	109	73	38	35	5	1,079
Influence Of Alcohol Or Drug	12	50	43	51	56	59	57	42	12	3	4		389
Wrong Side Of Road	28	50	34	29	22	16	29	22	21	13	6	6	276
Automobile Right-Of-Way	46	20	23	15	17	10	15	10	8	7	9	6	186
Improper Passing	13	28	25	20	18	19	9	11	10	3	2	2	160
Other Hazardous Violation	10	21	15	15	16	19	8	13	19	6	2		144
Unsafe Lane Change	12	23	17	11	16	6	9	12	8	3	6	6	129
Traffic Signals And Signs	29	26	14	16	12	5	5	10	3	2	2	3	127
Following Too Closely	3	11	13	10	12	11	12	13	7	1	3		96
Not Stated	5	8	8	10	9	8	9	3	4		3	2	69
Other Improper Driving	11	9	5	10	3	4	6	10	5	2	1	1	67
Unsafe Starting Or Backing	5	5	1	2	5	4	8	3	1	1	1	1	37
Unknown	3	7	2	6	1							1	20
Pedestrian Right-Of-Way		2	1	1				3	1		1	4	13
Other Equipment		1		1	1		2	2				1	8
Impeding Traffic				1				1					2
Fell Asleep		1	1										2
Brakes	1												1
Other Than Driver											1		1
<b>TOTAL</b>	<b>392</b>	<b>972</b>	<b>704</b>	<b>567</b>	<b>481</b>	<b>491</b>	<b>491</b>	<b>444</b>	<b>323</b>	<b>160</b>	<b>119</b>	<b>57</b>	<b>5,302</b>

Source: SWITRS

**FIGURE 10 INJURY COLLISIONS IN CALIFORNIA WHERE MOTORCYCLIST WAS AT FAULT (2005)**



Source: SWITRS

## STRATEGIES

California intends to employ the following strategies to reduce motorcyclist fatalities:

1. Educate the public on motorcycle safety.
2. Improve the training, testing, and licensing of motorcyclists.
3. Enhance the enforcement of motorcyclist violations and violations by the operators of other vehicles.
4. Increase the use of safety equipment by motorcyclists.
5. Improve motorcyclist visibility to other roadway users.
6. Improve roadway design to enhance motorcycle safety.
7. Promote the use of helmets that meet USDOT standards.

## SCAG RESPONSE

- Work with the State and county transportation commissions to determine if various project submissions have potential benefit to safety in this challenge area.

## CHALLENGE 13 : IMPROVE BICYCLING SAFETY

**Goal:** By 2010, reduce the number of bicycle roadway fatalities by 25 percent from their 2000 level.

According to the National Highway Traffic Safety Administration (NHTSA), 57 percent of all bicycle fatalities that occurred with the State of California in 2005 and 15 percent of nationwide bicycle fatalities happened within the SCAG Region. Table 25 provides an indication of the number of fatalities in the SCAG region since 1997.

According to the data provided in Table 26, it is apparent is that the 5-14 age group has had the most injuries of any other age group. In Imperial County, fully 49% of bicycle injuries within the county were within this age group.

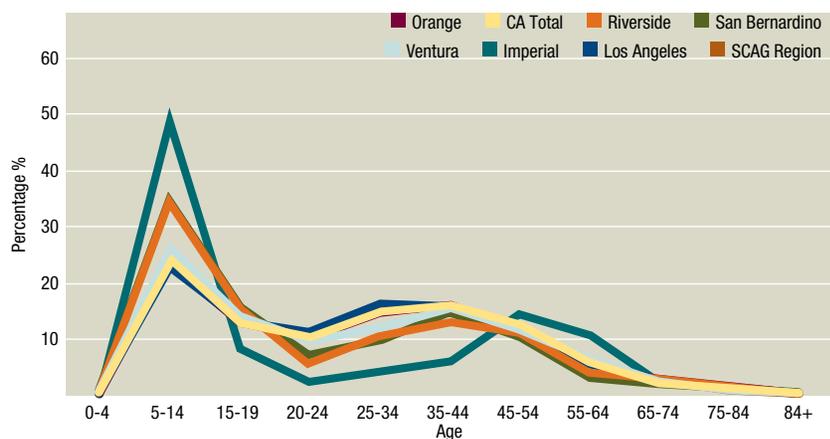
Historically, the primary goal of roadway design for urban thoroughfares and rural highways has been to increase vehicular traffic flow particularly at peak congestion times. This has created situations where slow speed bicycles are traveling at speeds less than 25 miles per hour are sharing lanes with cars often going at much greater speeds. This speed differential, coupled with the physics of a 30 pound bicycle colliding with, or being struck by, a 3000+ pound vehicle, is a factor in the severity of injuries.

**TABLE 25 BICYCLE FATALITIES**

County	1997	1998	1999	2000	2001	2002	2003	2004	2005
Imperial	0	2	2	2	1	2	0	0	0
Los Angeles	23	14	25	29	16	21	21	22	25
Orange	16	16	15	8	10	8	8	7	9
Riverside	3	11	5	9	9	14	7	8	15
San Bernardino	10	8	7	9	4	6	14	13	12
Ventura	2	4	0	6	6	4	3	2	5
SCAG Region	54	55	54	63	46	55	53	52	66
California	110	104	112	110	105	116	106	110	115
USA	814	760	754	693	732	665	629	727	784
SCAG % of CA	49%	53%	48%	57%	44%	47%	50%	47%	57%
CA % of USA	14%	14%	15%	16%	14%	17%	17%	15%	15%

Source: NHTSA National Center for Statistics Analysis

**FIGURE 11 BICYCLE INJURY COLLISIONS BY AGE AND COUNTY (2003-2005)**



Source: SWITRS

One obvious potential solution is to build more dedicated bicycle facilities<sup>10</sup> in order to separate bicyclists from motorists. This is not feasible in all situ-

<sup>10</sup> There are three types of bicycle facilities being referenced: Class 1 dedicated bike paths; Class 2 bike lanes on streets, and; class 3, bike routes where signage signifies bicyclists may be on

ations. In an urban built-out environment, there may be no room for additional facilities.

In addition, there is some debate amongst some regional bicycle advocates on the perceived safety of Class 2 bike lanes. Some advocates argue that every arterial should have a Class 2 bike lane and others argue that cyclists should be treated as any other vehicle on a public street.

Others argue that the “thin white line” of a Class 2 bike lane provides a false sense of safety and can lead to more accidents. Class 1 bike paths, separate from roadways are often multi-use with walkers and joggers, creating the potential for a fast moving bicycle to collide with a pedestrian. In addition, some advocates argue that where Class 1 bike paths intersect roadways, there is a greater collision potential due to lack of awareness and visibility.

However, inexperienced cyclists and basic cyclists may not have developed the skills necessary for riding bicycles safely on urban streets, particularly those under 14 or those older adults resuming bicycle riding for the first time

roadway. A detailed description is in the non motorized chapter of this Regional Transportation Plan.

**TABLE 26 INJURED VICTIMS AGE BY COUNTY (SWITRS 2003-2005)**

Age	0 - 4	5-14	15 - 19	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75 - 84	85 +	Total
Imperial	0	40	7	2	4	5	12	9	2	1	0	82
Los Angeles	47	2,119	1,216	1,039	1,537	1,471	1,092	520	187	76	15	9,319
Orange	17	723	405	320	451	508	351	194	86	46	2	3,103
Riverside	11	359	163	60	108	137	117	46	29	9	1	1,040
San Bernardino	8	350	156	72	97	149	106	34	21	6	2	1,001
Ventura	3	246	133	93	114	147	111	62	24	8	3	944
SCAG Region	75	3,478	1,917	1,526	2,203	2,280	1,672	819	320	137	22	14,449
CA Total	179	7,755	4,169	3,310	4,851	5,158	4,094	1,848	726	318	58	32,466

Source: SWITRS

since childhood. For these cyclists, dedicated bicycle facilities are perceived to be a requirement for riding on public streets.

The region has 3,218 miles of existing bicycle facilities, with another 3,170 planned. SCAG encourages each county to develop and update bi-annually a non-motorized transportation plan with a bicycle component (in order to be eligible for State Bicycle Transportation Account funds). These plans should incorporate to the extent possible the goals, objectives and strategies of the SHSP.

**TABLE 27 BICYCLE FACILITIES BY COUNTY (MILES)**

County	Imperial	Los Angeles	Orange	Riverside**	San Bernardino	Ventura
Existing						
Class 1	0	251	205	313 <sup>#</sup>	33	56
Class 2	0	481	639	160	60	251
Class 3	0	520	102	62	29	56
Total		1,252	946	535	122	363
Proposed						
Class 1	42	228	46	59	405	Unk
Class 2	212	524	155	164	890 <sup>*</sup>	Unk
Class 3	0	392	8	45	0	Unk
Total	254	1,145	208	268	1,295	Unk
Ultimate	254	2,397	1,154	803	1,417	Unk <sup>##</sup>
*Project could be Class 2 or Class 3						
**Riverside County has not developed a bicycle master plan						
<sup>#</sup> Does not include off road bicycle trails, equestrian trails, historic trails, etc.						
<sup>##</sup> Draft Ventura bicycle Plan not complete at time of this report						

Source: SWITRS

All counties, with the exception of Riverside County, have developed a bicycle or non-motorized transportation plan. Riverside County has a non-motorized element in the circulation component of their General Plan.

**TABLE 28 COUNTY BICYCLE PLANNING**

County	Plan Type	Last Update
Imperial	Bicycle Master Plan	2003 (updated 2007)
Los Angeles	Bicycle Plan	2006
Orange	Bicycle Commuter Bikeways	2001 (currently being updated)
Riverside	Circulation Component of General Plan	
San Bernardino	Non-Motorized	2001
Ventura	Bicycle Plan	2007 (draft)

Source: SWITRS

## STRATEGIES

California intends to employ the following strategies to reduce bicyclist fatalities on California's roadways:

1. Improve data collection regarding bicyclist trips, injuries, and fatalities on California roadways.
2. Incorporate bicyclists into smart growth, land use planning, and other local plans.
3. Enhance the enforcement of bicyclist and motorist roadway laws.
4. Educate all roadway users regarding the rights and responsibilities of bicyclists.
5. Promote and improve roadway safety infrastructure for bicyclist use.
6. Improve the visibility of bicyclists on the roadway.
7. Improve the safety of bicyclists traveling to and from schools, utilizing education, encouragement,
8. Enforcement and engineering techniques.
9. Increase the use of helmets and enforcement of related laws.
10. Improve bicycle safety expertise among transportation professionals.

## SCAG RESPONSE

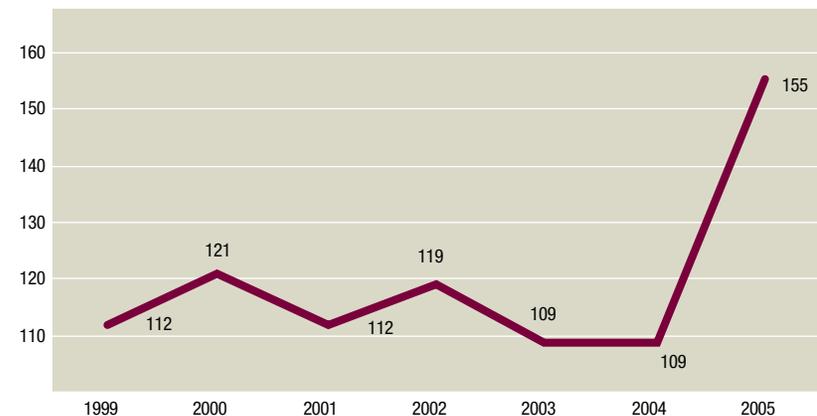
- Encourage the addition of dedicated bicycle facilities where appropriate and safe.
- Encourage all local jurisdictions to incorporate safety in their bicycle transportation plan updates.
- Incorporate applicable Complete Streets policies – providing safe access for all modes – as fundamental principles of transportation plans.
- Encourage the consideration of bicycle and pedestrian safety as part of Blueprint Land Use Planning.
- Encourage pedestrian and bicycle safety in all maintenance projects where new striping will be required or existing striping is to be replaced
- Encourage the use of intersection control devices that detect bicyclists, particularly left turn signals.

## CHALLENGE 14: ENHANCE WORK ZONE SAFETY

**Goal:** By 2010, reduce work zone fatalities by 10 percent from their 2004 level.

In researching for this challenge area, the Challenge Area Team noted that there were 155 work zone fatalities in California in 2005, representing a 42% increase over the annual average of 98 from 1995 to 2004. Work zone fatalities comprise 24% of all occupational fatalities. 26% of California's work zone fatalities occur as a result of rear-end collisions. If drivers had ½ second more warning, 60% of all rear-end crashes could be avoided.

**FIGURE 12 WORK ZONE FATALITIES**



Source: SWITRS

Highway work zones create a major safety concern for roadway users and workers alike. In 2003, national fatalities in work zones totaled 1,068. This number included 117 pedestrians, most of whom were construction workers, and 943 vehicle drivers and occupants.<sup>11</sup>

<sup>11</sup> Draft Strategic Highway Safety Plan

## STRATEGIES

California intends to employ the following strategies to reduce work zone fatalities:

1. Enhance safe driving through work zones with education and enforcement.
2. Improve traffic control in work zones.
3. Reduce worker exposure and improve worker visibility.
4. Apply advanced technology to enhance work zone area.
5. Improve data collection and analysis.

## SCAG RESPONSE

Work with the State and county transportation commissions to determine if various project submissions have potential benefit to safety in this challenge area.

## CHALLENGE 15 : IMPROVE POST CRASH SURVIVABILITY

**Goal:** By 2010, reduce crash-related fatalities in California at least 5 percent from their 2004 level through focused improvements in Emergency Medical Services (EMS) system communications, response and safety education.

In researching this challenge area, the Challenge Area Team noted:

In 2004 data showed 302,176 persons in California required Emergency Medical Service (EMS) response as a result of a serious motor vehicle collision<sup>12</sup>.

Challenge Area 15's focus is on the person that survives a serious motor vehicle collision. Improving EMS response time to the collision, transport time, and interfacility transfer time (when appropriate) will result in achieving the targeted "Golden Hour" (the time period from the incident until the victim receives definitive specialized trauma care; ideally no longer than 60 minutes) Adherence to the "Golden Hour" concept is critical to survival and optimum outcome.

The first peak in post crash deaths is within seconds or minutes of injury. If the number of these deaths is to be reduced, it must be through effective prevention programs. The second peak in deaths occurs within the first four hours after incident and is due to undiagnosed and untreated injuries. These patients, whose numbers are significant, would benefit most from appropriate level of trauma care. Regionalized trauma care facilitates rapid transport to the nearest trauma center appropriate for the severity of injury. These complications can be positively affected by prompt initial resuscitation efforts in an appropriate level trauma center.

<sup>12</sup> Statewide Integrated Traffic Records System (SWITRS) - [www.chp.ca.gov/switrs/](http://www.chp.ca.gov/switrs/)

## STRATEGIES

California intends to employ the following strategies to improve post-crash survivability:

1. Improve technology for locating crash sites and for improving EMS access routes and response times.
2. Ensure interoperability of communications systems between all responders to crash sites.
3. Improve patient transportation and destination from crash location.
4. Increase availability of appropriate-level trauma centers, with emphasis on rural areas.
5. Improve access to trauma-related training courses for Emergency Medical Technicians and paramedics.
6. Encourage Emergency Medical Dispatch programs to train dispatchers to assist victims awaiting arrival of EMS.
7. Improve data access to meet the needs of EMS.
8. Increase public access to first aid, cardio pulmonary resuscitation CPR, and automated external defibrillation training.

### SCAG Response

- Utilize Intelligent Transportation System technology to improve response time for EMS to and from collision sites.

## CHALLENGE 16 : IMPROVE SAFETY DATA COLLECTION, ACCESS AND ANALYSIS

**Goal:** Improve the quality, timeliness, accessibility, and usefulness of traffic safety data.

## STRATEGIES

California intends to employ the following strategies to improve safety data collection, access, and analysis:

1. Improve the quality, completeness, and uniformity of data collection practices.
2. Improve data sharing among State, federal, and local agencies and stakeholders.
3. Improve accessibility to real-time information by California roadway users.
4. Enhance accessibility of traffic safety data.
5. Improve data collection and analysis regarding trip characteristics of all roadway users, level of service, injuries, and fatalities on California road ways.
6. Coordinate traffic safety information system improvements through the State Traffic Records Coordinating Committee.

## SCAG RESPONSE

- Work with the State and county transportation commissions to improve the quality, timeliness, accessibility and usefulness of traffic safety data.
- Publish SHSP safety data and statistics in the annual State of the Region or State of the Commute report.

## Transportation Safety Strategic Plan

This final section is intended to summarize the existing and future conditions set forth in the previous sections. This strategic plan is meant as a guide for envisioning transportation safety planning throughout the SCAG region.

### POLICIES

Ensure transportation safety, security, and reliability for all people and goods in the region.

### GOALS AND OBJECTIVES

Reduce the absolute number of traffic fatalities to below that called for in each section of the California Strategic Highway Safety Plan.

### POLICIES AND RECOMMENDATIONS

1. Reduce Impaired Driving Related Fatalities
  - a. SCAG can support local jurisdictions and State authorities in their implementation of Challenges where SCAG has no role.
2. Reduce the Occurrence and Consequence of Leaving the Roadway and Head-on Collisions
  - a. Work with subregions and county transportation commissions to continue to incorporate into highway construction/reconstruction methods to warn drivers (such as rumble strips, “zot dots,” pavement markers, curve warning signs/beacons) they are leaving the highway or wandering into other lanes.
  - b. Support the continuing deployment of high visibility signage and road striping that enhance driver’s ability to notice, recognize and respond to warning signs during night time or periods of inclement weather.
3. Ensure Drivers are Licensed and Competent
  - a. SCAG can support local jurisdictions and State authorities in their implementation of Challenges where SCAG has no role.
4. Increase Use of Safety Belts and Child Safety Seats
  - a. SCAG can support local jurisdictions and State authorities in their implementation of Challenges where SCAG has no role.
5. Improve Driver Decisions about Rights of Way and Turning
  - a. Support the use of traffic control devices, traffic calming, and speed-reduction design practices to reduce the likelihood and severity of crashes related to turning movements.
  - b. Support improved roadway geometrics to restrict unsafe turns by motor vehicles.
  - c. Support the use of advanced technology and ITS to reduce collisions.
6. Reduce Young Driver Fatalities
  - a. SCAG can support local jurisdictions and State authorities in their implementation of Challenges where SCAG has no role.
7. Improve Intersection and Interchange Safety for Roadway Users
  - a. Incorporate intersection safety into the compass blueprint strategy.
  - b. Incorporate ITS at high incident intersections to reduce red-light violations causing collisions.
  - c. Encourage clearly marked, visible crosswalks
  - d. Encourage the installation of improved visibility traffic signals as part of the normal traffic signal replacement cycle.
  - e. Encourage development of median sanctuaries for pedestrians
  - f. Support signalization at problem non-signalized intersections
  - g. Encourage changing intersection geometries, where applicable. (offset intersection to aligned intersection, intersection to interchange, intersection to roundabout)

## 8. Make Walking and Street Crossing Safer

- a. Incorporate pedestrian safety into smart growth, land use planning, and other local plans.
- b. Enhance the enforcement of violations of pedestrian law by pedestrians and motorists.
- c. Educate all roadway users regarding the rights and responsibilities of pedestrians.
- d. Promote and improve roadway safety infrastructure for pedestrians including the use of advanced technology.
- e. Improve the visibility of pedestrians on the roadway.
- f. Improve the safety of pedestrians traveling to and from schools.
- g. Improve data collection and analysis regarding pedestrian trip characteristics, level of service, injuries and fatalities on California roadways.
- h. Improve pedestrian safety expertise among transportation professionals and others involved in the design process.
- i. Consider pedestrian needs in all roadway and transit projects

## 9. Improve Safety for Older Roadway Users

- a. Support JARC/New Freedom, paratransit to include those over 65 years of age.
- b. Support roadway, intersection and interchange improvements that support improving rights of way decision by older drivers.
- c. Encourage formation and expanded use of Supplemental Transportation Systems (STPs), particularly in locations where standard public transit is sparse or unavailable.
- d. Support signage and striping that enhance driver's ability to notice, recognize and respond to warning signs during night time and/or inclement weather conditions.

## 10. Reduce Speeding and Aggressive Driving

- a. Work with the State and county transportation commissions to determine if various project submissions have potential benefit to safety in this challenge area.

## 11. Improve Commercial Vehicle Safety

- a. Support the use of dedicated truck capacity on corridors with significant truck traffic in order to separate commercial vehicles from passenger vehicles.
- b. Support the continued modernization of intersections and interchanges prone to high commercial vehicle collisions to promote safety
- c. Support the use of truck climbing lanes as a method to segregate commercial vehicles from passenger vehicles.

## 12. Improve Motorcycle Safety

- a. Work with the State and county transportation commissions to determine if various project submissions have potential benefit to safety in this challenge area.

## 13. Improve Bicycling Safety

- a. Encourage the addition of dedicated bicycle facilities where appropriate and safe.
- b. Encourage all local jurisdictions to incorporate safety in their bicycle transportation plan updates.
- c. Incorporate applicable Complete Streets policies – providing safe access for all modes – as fundamental principles of transportation plans
- d. Encourage the consideration of bicycle and pedestrian safety as part of Blueprint Land Use Planning.

- e. Encourage pedestrian and bicycle safety in all maintenance projects where new striping will be required or existing striping is to be replaced
  - f. Encourage the use of intersection control devices that detect bicyclists, particularly left turn signals
14. Enhance Work Zone Safety
- a. Work with the State and county transportation commissions to determine if various project submissions have potential benefit to safety in this challenge area.
15. Improve Post Crash Survivability
- a. Utilize Intelligent Transportation System technology to improve response time for EMS to and from collision sites.
16. Improve Safety Data Collection, Access and Analysis
- a. Work with the State and county transportation commissions to improve the quality, timeliness, accessibility and usefulness of traffic safety data.
  - b. Publish SHSP safety data and statistics in the annual State of the Region or State of the Commute report

