

**CE 467 / 567 Highway Safety and Operations**  
**Homework 4**

Due Tuesday, October 17, 2006

Problem 1

The data on the following page are taken from ADOT's Traffic Crash Database, for what was the stop-controlled intersection of Kolb and Sabino Canyon in Tucson. There is also a schematic of the intersection, at the time when the crash data were collected (back in 1998-2001). [The intersection has been completely re-built since then.] The southbound direction on Kolb had a stop for left-turning traffic, but the right turn was not required to stop, since there was an extra lane on Sabino Canyon.

- (a) With these data, generate a collision diagram at the intersection. Be as descriptive as possible in your diagram.
- (b) From your collision diagram, what were the primary safety problems at this intersection?

Problem 2

Consider some statistics regarding traffic fatalities by county in Arizona. You can find fatalities by county through the NHTSA site, at:

[http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/4\\_AZ/2005/4\\_AZ\\_2005.htm](http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/4_AZ/2005/4_AZ_2005.htm)

Data on population by county and VMT by county are collected by ADOT and reported at:

<http://tpd.azdot.gov/datateam/hpms.php>

- (a) For the state of Arizona, for the years 2001-2005, identify and graph (vs. year):
  - (1) The number of traffic-related fatalities per year
  - (2) The traffic-related fatality rate per 100,000 persons (per year)
  - (3) The traffic-related fatality rate per 100 Million VMT (per year)
- (b) Repeat your analysis from (a), using the whole state of Arizona, but only for alcohol-related fatalities.
- (c) Repeat your analysis from part (a), using only data from Pima County.
- (d) Briefly (in a short paragraph each) comment on your results. Specifically:
  - (1) Are there any noticeable trends in the data?
  - (2) Do the trends in Pima County follow those in the state?
  - (3) Do all the trends point in the same direction? Or, do they differ depending on the statistic chosen?

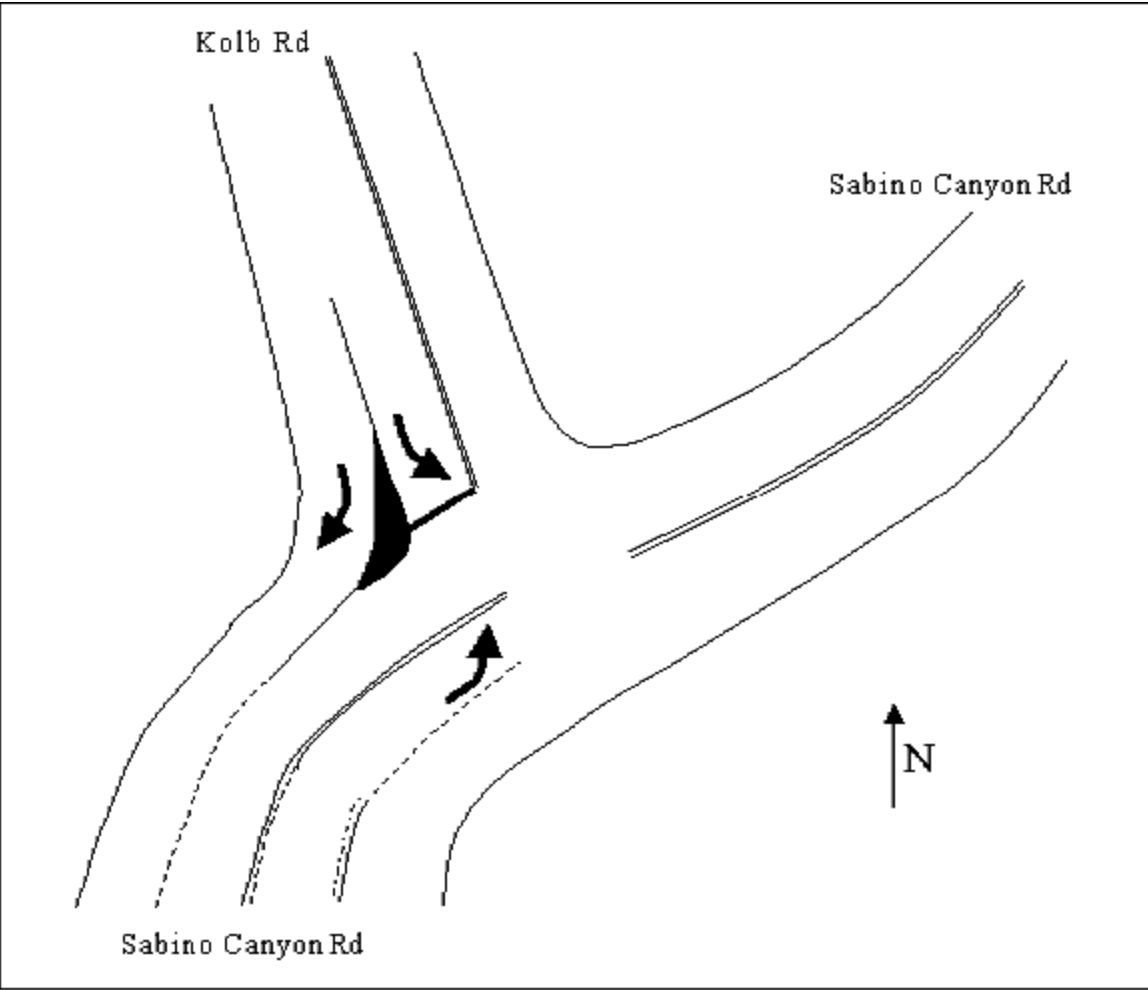
Problem 3

While not exactly up to date, Pima County has published crash statistics for intersections and road segments within their jurisdiction (unincorporated Pima County) on the web, at:

<http://www.dot.co.pima.az.us/trafeng/accstat/>

Note that you can cut and paste these data into a text file or Excel, if you want. Using information at this web site about *intersections*, answer the following questions:

- (a) Identify the top 5 intersections in the county in terms of:
  - (1) The crash frequency
  - (2) The crash rate
  - (2) The crash severity index
  - (3) The crash priority index
- (b) Discuss the similarities and differences from your answers to part (a). Are the same intersections in each list? Or, do they vary considerably? Would you expect this to be the case?
- (c) How does Pima County develop its crash priority index? Given your answer to part (b), do you think this is reasonable?



TRAFFIC RECORDS SECTION  
 REPORT NO: SP970-C03-1

ARIZONA DEPARTMENT OF TRANSPORTATION  
 MOTOR VEHICLE CRASH LISTING - SPECIFIC INTERSECTION

RUN ON 03-JUL-2001 11:47

ROAD-1= << KOLB RD  
 ROAD-2= << SABINO CANYON RD

BEG-DATE= Jan 01 1998 12:00AM END-DATE= Apr 30 2001 11:59PM

----- LOCATION -----			--> <DTE & TIME>		<--- DRIVER ---> <----- VEHICLE ----->										<CTRL DVC>		<--- GENERAL --->											
ON	DIST	INTERSECT	D	OFCR	IN VIOL	VISN	PC	COND	TYPE	SO	DT	VACT	RS	HE	H	L	W	<CTRL DVC>		<--- GENERAL --->								
STREET	DIR	X.XXX STREET	W	YYMMDD HH:MM NCIC RPT#	MICROFLM	12	V1V2	V1V2	12	V1V2	V1V2	12	12	V1V2	12	CD	R	C	C	Q	R	S	F	I	R	U	S	M
KOLB	RD	SABINO CANYON	RD	7 980418 18:55 1000 18287	05961079	11	0102	0101	11	0101	0101	YY	SS	0505	11	16	N	2	1	P	DP	I	I				1	5
KOLB	RD	SABINO CANYON	RD	5 990715 18:59 1000 15357	07071166	11	0201	0101	11	0101	0101	YY	SS	0505	11	16	N	L	2	P		I	I				3	5
KOLB	RD	P 6 SABINO CANYON	RD	2 000228 14:50 1000 28191	07870078	12	1805	0101	11	0101	0401	YY	SS	0301	81	16	N	L	1			I	J			1		5
KOLB	RD	P 2 SABINO CANYON	RD	5 000413 07:42 1000 13049	08150092	11	0115	0101	11	0101	0101	YY	SS	0505	11	16	N	L	1			I	J					5
KOLB	RD	M 2 SABINO CANYON	RD	7 000819 07:10 1000 19086	08560405	11	0102	0101	11	0101	0101	YY	NN	0305	21	16	N	L	1	P		I	J					5
KOLB	RD	SABINO CANYON	RD	3 001010 13:35 1000 10190	08690375	11	0102	0101	11	0101	1701	YY	ES	0505	11	16	N	L	1		P	I	I			1		3
KOLB	RD	SABINO CANYON	RD	3 001212 20:30 1097 10407	08722503	1	18	07	1	01	15	Y	S	05	1	13	N	D	1			I	I					3 0
KOLB	RD	SABINO CANYON	RD	2 010108 23:42 1000 108330	08860757	1	02	14	1	01	01	N	S	01	1	32	N	D	2	P	P	I	I					1 0
SABINO CANYON	RD	KOLB	RD	4 980204 12:23 1000 04132	05741039	11	0401	0101	11	0101	0101	YY	ES	0401	11	16	N	L	1	P		I	I					3
SABINO CANYON	RD	KOLB	RD	4 980923 08:05 1000 23071	06181260	11	0102	0101	11	0101	0101	YY	EE	0505	11	16	N	L	1	P	P	I	I			1		5
SABINO CANYON	RD	M 28 KOLB	RD	6 980925 20:00 1000 25327	06181787	11	0102	0101	11	0101	0104	YN	NN	0404	11	16	N	D	1		P	I	J			1		5
SABINO CANYON	RD	KOLB	RD	4 990929 09:31 1000 29115	07311636	21	0401	1616	11	0101	0104	YY	NS	0401	11	16	N	L	1		P	I	I			3	1	4
SABINO CANYON	RD	KOLB	RD	7 991002 20:25 1000 00000	07271038	16	0104	0101	11	0114	0117	YY	SN	0104	11	16	Y	D	1		P	I	I			1		4
SABINO CANYON	RD	KOLB	RD	6 000114 18:50 1000 14251	07673285	11	0401	1001	91	0101	0104	YN	NS	0401	11	16	N	D	1			I	I					4
SABINO CANYON	RD	KOLB	RD	4 000202 22:09 1000 02326	07742788	4	03	01	2	01	01	N	N	01	1	29	N	D	1		P	I	I			1	1	8 0
SABINO CANYON	RD	KOLB	RD	2 000508 12:44 1000 08165	08220438	11	0104	0101	11	0101	0101	YY	SE	0104	11	16	N	L	1	P	P	I	I			1	1	3
SABINO CANYON	RD	P 4 KOLB	RD	5 000601 11:00 1000 01117	08270585	11	1519	0101	11	0101	0401	YY	NN	0101	11	16	N	L	1			I	J					1 3 1

TOTAL RECORDS PRINTED =====> 17