Appendix C

- **INTEGRATION Description**
- **FORTRAN Code**
- **ANOVA – SAS File and Output**
- **Simulation Output**

Appendix C

This appendix presents a brief description of the INTEGRATION model that was used in this thesis. The most important simulation features will be presented as well as the input and output files of the model. Also included is the FORTRAN code used for the safety model and the calculation of the accident risk.

C.1 Background

The INTEGRATION traffic simulation model was developed in the mid-1980's by Dr. Michel Van Aerde. It is an integrated simulation and traffic assignment model (Van Aerde, 1985). INTEGRATION is a dynamic and microscopic traffic simulation model. The traffic flow in the model is represented as a series of individual vehicles that each follow pre-specified macroscopic traffic flow relationships.

C.2 Model Input Requirements

The input data are required to run the model and these are divided into fundamental and advanced data. Table C-1 below provides a listing of the fundamental input data files and their content in brief.

Table C-1 Fundamental input data files

File Name	Description
Master File	Master control file which specifies the global simulation parameters, and the location as well as the names of any input and output files
File 1	Node characteristics
File 2	Link characteristics and coordinates
File 3	Signal timing plans
File 4	O-D traffic demands
File 5	Incident descriptions

C.3 Model Output

INTEGRATION provides a variety of simulation outputs to be used by the model user. These include the following:

- On-Screen Graphics/text
- Simulation Run time Errors (runerr.out file)
- Labeled Output Statistics (file10.dat file)
- Summary Statistics (summary.out file)

Of greater interest in this thesis was the summary statistics file that provided a summary of important aggregate network level measures of performance. The summary.out file is automatically produced whenever a simulation run is completed. Data are categorized according to the vehicle type (5 vehicle types) with a cumulative total across all vehicle types. A sample summary output is attached for explanation purposes in the following section.

C.4 Sample summary output

The following is a summary output file after the sample network explained in chapter 4 was simulated using INTEGRATION. Accident risk results are highlighted in order to stress the output statistics produced by the model in terms of its safety model.

1	1	1	1	1	1	5 - vehicles
2	30	36	45	60	90	261 - veh-secs
3	0	0	0	0	0	4 - veh-km
4	0	0	0	0	0	0 - veh-stops
5	0	0	0	0	0	0 - wrng turn
6	0	0	0	0	0	0 - fuel (l)
7	0	0	0	0	0	0 - HC (g)
8	5	2	1	1	1	12 - CO (g)
9	0	0	0	0	0	1 - NO (g)
10	**0**	**0**	**0**	**1**	**3**	**6 - acc* 10e6**
11	0	0	0	0	0	0 - tot delay
12	0	0	0	0	0	0 - stp delay
13	0	0	0	0	0	0 - ac/dc del
14	0	0	0	0	0	0 - dollars
15	1	1	1	1	1	5 - persons
16	30	36	45	60	90	261 - per-hrs
17	0	0	0	0	0	4 - per-km
18	15	7	2	0	0	26 - acc-noise
19	0	0	0	0	0	0
20	0	0	0	0	0	0

1	1.000	1.000	1.000	1.000	1.000	1.000 - vehicles
2	30.000	36.000	45.000	60.000	90.000	52.200 - veh-secs
3	0.998	0.998	0.998	0.999	0.999	0.998 - veh-km
4	0.003	0.003	0.002	0.002	0.001	0.002 - veh-stops
5	0.000	0.000	0.000	0.000	0.000	0.000 - wrng turn
6	0.105	0.089	0.085	0.090	0.105	0.095 - fuel (l)
7	0.242	0.134	0.096	0.084	0.090	0.129 - HC (g)
8	5.768	2.673	1.761	1.429	1.278	2.582 - CO (g)
9	0.433	0.308	0.226	0.170	0.137	0.255 - NO (g)
10	**0.368**	**0.568**	**0.913**	**1.567**	**3.024**	**1.288 - acc* 10e6**
11	0.069	0.072	0.075	0.077	0.082	0.075 - tot delay
12	0.000	0.000	0.000	0.000	0.000	0.000 - stp delay
13	0.069	0.072	0.075	0.077	0.082	0.075 - ac/dc del
14	0.000	0.000	0.000	0.000	0.000	0.000 - dollars
15	1.000	1.000	1.000	1.000	1.000	1.000 - persons
16	30.000	36.000	45.000	60.000	90.000	52.200 - per-hrs
17	0.998	0.998	0.998	0.999	0.999	0.998 - per-km
18	15.923	7.424	2.755	0.734	0.116	5.390 - acc-noise
19	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000

C.5 Discussion

For the development of this thesis and for study purposes, INTEGRATION 2.20e for Windows was used. The model included the safety model input, which was furthermore analyzed for the purposes of this thesis. Input data (charts) as well as the output produced can be found in chapters 4 and 5.

C.6 FORTRAN Implementation of the Safety Model

The FORTAN code below consists of a main program (main) and three subroutines (acc_rat, acc_dam and acc_inj) as they were discussed in chapter 5.

```
program main
c
c     - Macroscopic Safety Model 1.3 - Copyright M.Van Aerde(1999)
c     - for MMDI Evaluation Study purposes only
c
c   1. rate1(i) - crashes/ million veh-sec type 1 to 14 plus total (15)
c   2. rate2(i) - crashes/ million veh-km  type 1-14 plus total
c   3. dam(i)   - property damage levels: 1 to 4
c                     a. No damage
c                     b. Minor damage
c                     c. Moderate damage
c                     d. Major damage
c   4. inj(i)   - injury levels: 1 to 5
c                     a. No injury
c                     b. Minor injury
c                     c. Non-incapacitating injury
c                     d. Incapacitating injury
c                     e. Fatal injury
c
       real  rate1(15),rate2(15),dam(4),inj(5)

       open(unit=9,file='acc_mod.out',status='unknown')
       write(9,*) ' accident rates '
c      - speeds from 20 to 120 km/h
       do 1100 i = 20,120,20
           xspd = i
           call acc_rat(xspd,rate1,rate2)

           irate = 1
           write(9,'(f6.1,i5,15f9.5)')   xspd,irate,(rate1(j),j=1,15)
           irate = 2
           write(9,'(f6.1,i5,15f9.5)')   xspd,irate,(rate2(j),j=1,15)
c          - damage probabilities per crash
           call acc_dam(xspd,dam)
           itype = 1
           write(9,'(f6.1,i5,15f9.5)')   xspd,itype,(dam(j),j=1,4)
c          - injury probabilities per crash
           call acc_inj(xspd,inj)
           itype = 2
           write(9,'(f6.1,i5,15f9.5)')   xspd,itype,(inj(j),j=1,5)
 1100  continue

      end
```

```
c     ------------------------------------------------------------------
      subroutine acc_rat(xspd,rate1,rate2)

      real  rate1(15),rate2(15),spd
      real  c1(15),c2(15)

      data c1/-0.021501436,-0.023559071,-0.01709544,-0.019589495,
     *        -0.041110596,-0.023089944,-0.026041357,-0.032079684,
     *        -0.020100423,-0.020957402,-0.019926275,-0.019976246,
     *        -0.014536839,-0.017781349,-0.020170247/
      data c2/-4.903643188,-5.013290246,-4.483434319,-4.283242043,
     *        -6.600147706,-5.340775704,-6.694593649,-5.641286798,
     *        -5.154935427,-4.715896567,-4.589321771,-5.073630589,
     *        -7.133251805,-4.848826862,-2.419018353/

c     - spd is in mph
      spd = xspd/1.6
c     - model only valid from 20 to 120 km/h
      if (spd.lt. 20) spd = 20
      if (spd.gt. 70) spd = 70

        do 1100 i =1,15
           p1 =  c1(i)*spd + c2(i)
c          - crash rate per million veh-sec
           rate1(i) = exp(p1)
c          - accident rate per million veh-km
           rate2(i) = rate1(i) / (spd*1.6) * 3600
c          write(9,'(a,i5,6f10.5)') ' p1 c1 c2 spd ',
c    *          i,p1,c1(i),c2(i),spd,rate1(i),rate2(i)
 1100   continue
      end
c     ------------------------------------------------------------------
      subroutine acc_dam(xspd,dam)

      real    dam(4)

      real    c(16)

c     minor, moderate, major and no  damage

      data   c/-0.239700394,0.020748326 ,-0.000456083, 3.07144E-06,
     *          1.880157356,-0.115168621, 0.002713999,-1.98096E-05,
     *         -0.408725633, 0.053370557,-0.001282669, 9.55118E-06,
     *         -0.361429514, 0.044930641,-0.001113984, 8.48361E-06/

      spd = xspd/1.6
      if (spd.lt. 20) spd = 20
      if (spd.gt. 70) spd = 70


      s1= spd
      s2= spd**2.0
      s3= spd**3.0

      dam(1) = c( 1) +  c( 2)*s1 + c( 3)*s2 + c( 4)*s3
      dam(2) = c( 5) +  c( 6)*s1 + c( 7)*s2 + c( 8)*s3
      dam(3) = c( 9) +  c(10)*s1 + c(11)*s2 + c(12)*s3
```

```
      dam(4) = c(13) +  c(14)*s1 + c(15)*s2 + c(16)*s3

c     normalize accident risk to sum up to 1.0
      TotDam = 0
      do i = 1,4
        TotDam = TotDam + dam(i)
      end do
      if (TotDam.gt.0) then
        do i = 1,4
          dam(i) = dam(i)/TotDam
        end do
      end if

      end
c     ============================================================

      subroutine acc_inj(xspd,inj)

      real    inj(5)

      real    c(20)

c     no inj, possible inj, non-incap, incap, fatal

      data   c/0.684906791,-0.018349016, 0.000404226,-2.93146E-06,
     *         0.061498825, 0.001148376, 8.36568E-05,-1.31214E-06,
     *         0.381316662,-0.011131083, 0.000156714,-7.44377E-07,
     *        -0.330753659, 0.030304057,-0.00069379 , 5.08542E-06,
     *        -0.0339185  , 0.002760289,-6.63681E-05, 5.31696E-07/

      spd = xspd/1.6
      if (spd.lt. 25) spd = 25
      if (spd.gt. 70) spd = 70

      s1= spd
      s2= spd**2.0
      s3= spd**3.0

      inj(1) = c( 1) +  c( 2)*s1 + c( 3)*s2  + c( 4)*s3
      inj(2) = c( 5) +  c( 6)*s1 + c( 7)*s2  + c( 8)*s3
      inj(3) = c( 9) +  c(10)*s1 + c(11)*s2  + c(12)*s3
      inj(4) = c(13) +  c(14)*s1 + c(15)*s2  + c(16)*s3
      inj(5) = c(17) +  c(18)*s1 + c(19)*s2  + c(20)*s3

c     normalize accident risk to sum up to 1.0
      TotInj = 0
      do i = 1,5
        TotInj = TotInj + inj(i)
      end do
      if (TotInj.gt.0) then
        do i = 1,5
          inj(i) = inj(i)/TotInj
        end do
      end if

      end
c     ============================================================
```

C.7 SAS ANOVA File

```
DATA mmdi;
  Infile 'e:\hesham\mmdi\phoenix\gps\win_99\anova\rur_sum2.out';
  Input seq flag car day per dir iseq Spd Stops Delay Fuel HC CO NOx
Crash Injury Fatal Minor Mod Major;

proc print;
  var seq flag car day per dir iseq Spd Stops Delay Fuel HC CO NOx
Crash Injury Fatal Minor Mod Major;
run;

proc univariate normal;
   var Spd Stops Delay Fuel HC CO NOx Crash Injury Fatal Minor Mod
Major;
run;

proc glm;
   class flag dir per;
   model Spd Stops Delay Fuel HC CO NOx Crash Injury Fatal Minor Mod
Major= flag|dir|per/ss3;
run;

proc sort;
   by dir per flag;
proc means;
   by dir per flag;
```

C.8 SAS Univariate Procedure / Output

The SAS System
Univariate Procedure

Variable=SPD

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	56.47	99%	55.77
Mean	43.84648	Sum	13197.79	75% Q3	48.38	95%	53.37
Std Dev	6.485427	Variance	42.06076	50% Med	44.15	90%	51.49
Skewness	-0.65047	Kurtosis	0.476372	25% Q1	40.35	10%	35.43
USS	591294.8	CSS	12618.23	0% Min	23.99	5%	31.99
CV	14.79122	Std Mean	0.373814			1%	25.18
T:Mean=0	117.295	Pr>|T|	0.0001	Range	32.48		
Num ^= 0	301	Num > 0	301	Q3-Q1	8.03		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	49.96		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.954391	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
23.99(	106)	55.28(	80)
24.72(	97)	55.77(	216)
25.15(	284)	55.85(	160)
25.18(	132)	56.23(	126)
25.22(	114)	56.47(	227)

The SAS System

Univariate Procedure
Variable=STOPS

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	11.56	99%	10.99
Mean	6.945548	Sum	2090.61	75% Q3	7.76	95%	9.89
Std Dev	1.499057	Variance	2.247171	50% Med	6.75	90%	8.92
Skewness	0.641519	Kurtosis	0.471449	25% Q1	5.88	10%	5.22
USS	15194.58	CSS	674.1514	0% Min	3.3	5%	4.72
CV	21.58299	Std Mean	0.086404			1%	4.16
T:Mean=0	80.38438	Pr>|T|	0.0001	Range	8.26		
Num ^= 0	301	Num > 0	301	Q3-Q1	1.88		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	5.2		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.959798	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
3.3(	126)	10.9(	89)
3.78(	282)	10.99(	132)
3.87(	216)	11.21(	79)
4.16(	84)	11.56(	96)
4.46(	160)	11.56(	97)

The SAS System

Univariate Procedure
Variable=CRASH

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	46.56	99%	43.83
Mean	26.0486	Sum	7840.63	75% Q3	27.6	95%	34.51
Std Dev	4.664261	Variance	21.75533	50% Med	25.16	90%	31.56
Skewness	1.79993	Kurtosis	4.227997	25% Q1	23.02	10%	21.62
USS	210764.1	CSS	6526.6	0% Min	18.08	5%	20.71
CV	17.90599	Std Mean	0.268844			1%	20.13
T:Mean=0	96.89131	Pr>|T|	0.0001	Range	28.48		
Num ^= 0	301	Num > 0	301	Q3-Q1	4.58		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	22.73		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.846678	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
18.08(	59)	43.41(	284)
19.74(	126)	43.83(	132)
19.87(	227)	44.41(	114)
20.13(	216)	44.48(	97)
20.19(	160)	46.56(	106)

The SAS System
Univariate Procedure

Variable=INJURY

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	22.09	99%	20.78
Mean	12.48532	Sum	3758.08	75% Q3	13.22	95%	16.43
Std Dev	2.181283	Variance	4.757996	50% Med	12.06	90%	15.07
Skewness	1.791234	Kurtosis	4.200591	25% Q1	11.07	10%	10.44
USS	48348.21	CSS	1427.399	0% Min	8.73	5%	10
CV	17.47079	Std Mean	0.125727			1%	9.69
T:Mean=0	99.30491	Pr>|T|	0.0001	Range	13.36		
Num ^= 0	301	Num > 0	301	Q3-Q1	2.15		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	10.91		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.8482	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
8.73(	59)	20.6(	284)
9.51(	126)	20.78(	132)
9.55(	227)	21.07(	97)
9.69(	80)	21.08(	114)
9.74(	216)	22.09(	106)

The SAS System
Univariate Procedure

Variable=FATAL

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	0.15	99%	0.14
Mean	0.105615	Sum	31.79	75% Q3	0.11	95%	0.12
Std Dev	0.009312	Variance	0.000087	50% Med	0.1	90%	0.12
Skewness	1.627605	Kurtosis	4.233024	25% Q1	0.1	10%	0.1
USS	3.3835	CSS	0.026011	0% Min	0.08	5%	0.1
CV	8.816502	Std Mean	0.000537			1%	0.09
T:Mean=0	196.7827	Pr>|T|	0.0001	Range	0.07		
Num ^= 0	301	Num > 0	301	Q3-Q1	0.01		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	0.1		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.76908	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
0.08(	59)	0.14(	114)
0.09(	280)	0.14(	132)
0.09(	274)	0.14(	269)
0.09(	256)	0.14(	284)
0.09(	227)	0.15(	106)

The SAS System
Univariate Procedure

Variable=MINOR

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	1.59	99%	1.49
Mean	1.236213	Sum	372.1	75% Q3	1.29	95%	1.4
Std Dev	0.090334	Variance	0.00816	50% Med	1.23	90%	1.34
Skewness	0.609614	Kurtosis	1.398246	25% Q1	1.18	10%	1.14
USS	462.4428	CSS	2.448082	0% Min	0.99	5%	1.1
CV	7.307338	Std Mean	0.005207			1%	1.05
T:Mean=0	237.4237	Pr>|T|	0.0001	Range	0.6		
Num ^= 0	301	Num > 0	301	Q3-Q1	0.11		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	1.19		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.965968	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
0.99(	80)	1.49(	96)
0.99(	59)	1.49(	122)
1.03(	244)	1.49(	132)
1.05(	286)	1.55(	114)
1.05(	256)	1.59(	106)

The SAS System
Univariate Procedure

Variable=MOD

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	23.23	99%	21.89
Mean	11.72591	Sum	3529.5	75% Q3	12.52	95%	16.68
Std Dev	2.617234	Variance	6.849914	50% Med	11.14	90%	14.69
Skewness	1.889386	Kurtosis	4.580361	25% Q1	9.98	10%	9.21
USS	43441.59	CSS	2054.974	0% Min	7.58	5%	9.03
CV	22.32009	Std Mean	0.150855			1%	8.44
T:Mean=0	77.72977	Pr>|T|	0.0001	Range	15.65		
Num ^= 0	301	Num > 0	301	Q3-Q1	2.54		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	9.89		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.833279	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
7.58(	59)	21.68(	284)
8.25(	216)	21.89(	132)
8.33(	126)	21.98(	114)
8.44(	160)	22.5(	97)
8.44(	125)	23.23(	106)

The SAS System
Univariate Procedure

Variable=MAJOR

Moments				Quantiles(Def=5)			
N	301	Sum Wgts	301	100% Max	12.7	99%	11.94
Mean	7.687774	Sum	2314.02	75% Q3	8.1	95%	9.74
Std Dev	1.14771	Variance	1.317238	50% Med	7.48	90%	9.05
Skewness	1.662665	Kurtosis	3.756376	25% Q1	6.94	10%	6.62
USS	18184.83	CSS	395.1714	0% Min	5.59	5%	6.31
CV	14.92903	Std Mean	0.066153			1%	6.09
T:Mean=0	116.2122	Pr>|T|	0.0001	Range	7.11		
Num ^= 0	301	Num > 0	301	Q3-Q1	1.16		
M(Sign)	150.5	Pr>=|M|	0.0001	Mode	6.98		
Sgn Rank	22725.5	Pr>=|S|	0.0001				
W:Normal	0.867059	Pr<W	0.0001				

Extremes

Lowest	Obs	Highest	Obs
5.59(	59)	11.83(	284)
5.93(	80)	11.94(	132)
5.97(	227)	12(	97)
6.09(	126)	12.2(	114)
6.1(	244)	12.7(	106)

The SAS System
General Linear Models Procedure
Class Level Information

Class	Levels	Values
FLAG	2	1 2
DIR	2	1 2
PER	3	1 2 3

Number of observations in data set = 301

Dependent Variable: SPD

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	6542.42984946	594.76634995	28.29	0.0001
Error	289	6075.79921765	21.02352670		
Corrected Total	300	12618.22906711			

R-Square	C.V.	Root MSE	SPD Mean
0.518490	10.45726	4.58514195	43.84647841

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	420.81559260	420.81559260	20.02	0.0001
DIR	1	64.32625836	64.32625836	3.06	0.0813
FLAG*DIR	1	0.24367378	0.24367378	0.01	0.9143
PER	2	5349.30654345	2674.65327172	127.22	0.0001
FLAG*PER	2	265.02078238	132.51039119	6.30	0.0021
DIR*PER	2	678.34679277	339.17339638	16.13	0.0001
FLAG*DIR*PER	2	258.32314891	129.16157446	6.14	0.0024

Dependent Variable: STOPS

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	273.69070590	24.88097326	17.96	0.0001
Error	289	400.46072865	1.38567726		
Corrected Total	300	674.15143455			

R-Square	C.V.	Root MSE	STOPS Mean
0.405978	16.94824	1.17714794	6.94554817

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	4.95627873	4.95627873	3.58	0.0596
DIR	1	16.12144586	16.12144586	11.63	0.0007
FLAG*DIR	1	3.99043919	3.99043919	2.88	0.0908
PER	2	193.84791354	96.92395677	69.95	0.0001
FLAG*PER	2	10.20770136	5.10385068	3.68	0.0263
DIR*PER	2	48.64064663	24.32032331	17.55	0.0001
FLAG*DIR*PER	2	22.54813593	11.27406797	8.14	0.0004

Dependent Variable: DELAY

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	3487032.12503946	317002.92045813	34.04	0.0001
Error	289	2691686.74386220	9313.79496146		
Corrected Total	300	6178718.86890167			

R-Square	C.V.	Root MSE	DELAY Mean
0.564362	25.81797	96.50800465	373.80172757

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	238820.14910143	238820.14910143	25.64	0.0001
DIR	1	138414.20948493	138414.20948493	14.86	0.0001
FLAG*DIR	1	14751.39334339	14751.39334339	1.58	0.2092
PER	2	2537589.75448433	1268794.87724217	136.23	0.0001
FLAG*PER	2	232767.73863193	116383.86931596	12.50	0.0001
DIR*PER	2	531743.16309800	265871.58154900	28.55	0.0001
FLAG*DIR*PER	2	192570.93721309	96285.46860654	10.34	0.0001

Dependent Variable: FUEL

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	1.44217932	0.13110721	23.15	0.0001
Error	289	1.63705523	0.00566455		
Corrected Total	300	3.07923455			

R-Square	C.V.	Root MSE	FUEL Mean
0.468356	6.348389	0.07526321	1.18554817

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	0.04628558	0.04628558	8.17	0.0046
DIR	1	0.10854454	0.10854454	19.16	0.0001
FLAG*DIR	1	0.01340439	0.01340439	2.37	0.1251
PER	2	1.04272821	0.52136410	92.04	0.0001
FLAG*PER	2	0.08291165	0.04145582	7.32	0.0008
DIR*PER	2	0.20988281	0.10494140	18.53	0.0001
FLAG*DIR*PER	2	0.09080186	0.04540093	8.01	0.0004

Dependent Variable: HC

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	1.05661239	0.09605567	8.28	0.0001
Error	289	3.35357300	0.01160406		
Corrected Total	300	4.41018538			

R-Square	C.V.	Root MSE	HC Mean
0.239585	8.870992	0.10772214	1.21431894

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	0.00090160	0.00090160	0.08	0.7806
DIR	1	0.13875337	0.13875337	11.96	0.0006
FLAG*DIR	1	0.01681249	0.01681249	1.45	0.2297
PER	2	0.71533840	0.35766920	30.82	0.0001
FLAG*PER	2	0.07863103	0.03931552	3.39	0.0351
DIR*PER	2	0.12174710	0.06087355	5.25	0.0058
FLAG*DIR*PER	2	0.08307408	0.04153704	3.58	0.0291

Dependent Variable: CO

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	13.73945748	1.24904159	5.83	0.0001
Error	289	61.89824352	0.21418077		
Corrected Total	300	75.63770100			

R-Square	C.V.	Root MSE	CO Mean
0.181648	2.981031	0.46279669	15.52471761

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	0.90185512	0.90185512	4.21	0.0411
DIR	1	2.79364782	2.79364782	13.04	0.0004
FLAG*DIR	1	0.91724675	0.91724675	4.28	0.0394
PER	2	5.45622439	2.72811219	12.74	0.0001
FLAG*PER	2	2.30907080	1.15453540	5.39	0.0050
DIR*PER	2	0.16271113	0.08135556	0.38	0.6843
FLAG*DIR*PER	2	1.92897557	0.96448778	4.50	0.0119

Dependent Variable: NOX

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	3.71001953	0.33727450	1.22	0.2721
Error	289	79.81219177	0.27616675		
Corrected Total	300	83.52221130			

R-Square	C.V.	Root MSE	NOX Mean
0.044420	16.59222	0.52551570	3.16724252

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	0.01923947	0.01923947	0.07	0.7920
DIR	1	0.62962206	0.62962206	2.28	0.1322
FLAG*DIR	1	0.12975707	0.12975707	0.47	0.4936
PER	2	2.05856527	1.02928264	3.73	0.0252
FLAG*PER	2	0.64484556	0.32242278	1.17	0.3126
DIR*PER	2	0.11347496	0.05673748	0.21	0.8144
FLAG*DIR*PER	2	0.26103982	0.13051991	0.47	0.6239

Dependent Variable: CRASH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	3662.35508418	332.94137129	33.59	0.0001
Error	289	2864.24532977	9.91088349		
Corrected Total	300	6526.60041395			

R-Square	C.V.	Root MSE	CRASH Mean
0.561143	12.08570	3.14815557	26.04860465

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	249.95578258	249.95578258	25.22	0.0001
DIR	1	142.02581463	142.02581463	14.33	0.0002
FLAG*DIR	1	18.31030692	18.31030692	1.85	0.1751
PER	2	2665.97386308	1332.98693154	134.50	0.0001
FLAG*PER	2	246.28662515	123.14331257	12.43	0.0001
DIR*PER	2	561.67060764	280.83530382	28.34	0.0001
FLAG*DIR*PER	2	200.16904590	100.08452295	10.10	0.0001

Dependent Variable: INJURY

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	800.47638280	72.77058025	33.55	0.0001
Error	289	626.92251222	2.16928205		
Corrected Total	300	1427.39889502			

R-Square	C.V.	Root MSE	INJURY Mean
0.560794	11.79664	1.47284828	12.48531561

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	56.15660634	56.15660634	25.89	0.0001
DIR	1	30.09948145	30.09948145	13.88	0.0002
FLAG*DIR	1	3.88896848	3.88896848	1.79	0.1816
PER	2	582.70522600	291.35261300	134.31	0.0001
FLAG*PER	2	53.36752770	26.68376385	12.30	0.0001
DIR*PER	2	123.14561541	61.57280771	28.38	0.0001
FLAG*DIR*PER	2	43.19040015	21.59520008	9.95	0.0001

Dependent Variable: FATAL

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	0.01206347	0.00109668	22.72	0.0001
Error	289	0.01394783	0.00004826		
Corrected Total	300	0.02601130			

R-Square	C.V.	Root MSE	FATAL Mean
0.463778	6.577795	0.00694711	0.10561462

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	0.00100442	0.00100442	20.81	0.0001
DIR	1	0.00021766	0.00021766	4.51	0.0345
FLAG*DIR	1	0.00013367	0.00013367	2.77	0.0972
PER	2	0.00897626	0.00448813	92.99	0.0001
FLAG*PER	2	0.00091690	0.00045845	9.50	0.0001
DIR*PER	2	0.00166376	0.00083188	17.24	0.0001
FLAG*DIR*PER	2	0.00060956	0.00030478	6.32	0.0021

Dependent Variable: MINOR

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	1.13401798	0.10309254	22.67	0.0001
Error	289	1.31406441	0.00454694		
Corrected Total	300	2.44808239			

R-Square	C.V.	Root MSE	MINOR Mean
0.463227	5.454642	0.06743097	1.23621262

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	0.17757184	0.17757184	39.05	0.0001
DIR	1	0.00078452	0.00078452	0.17	0.6782
FLAG*DIR	1	0.00099027	0.00099027	0.22	0.6411
PER	2	0.80840727	0.40420364	88.90	0.0001
FLAG*PER	2	0.03189867	0.01594934	3.51	0.0312
DIR*PER	2	0.18562542	0.09281271	20.41	0.0001
FLAG*DIR*PER	2	0.02300954	0.01150477	2.53	0.0814

Dependent Variable: MOD

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	1143.62369186	103.96579017	32.97	0.0001
Error	289	911.35058189	3.15346222		
Corrected Total	300	2054.97427375			

R-Square	C.V.	Root MSE	MOD Mean
0.556515	15.14423	1.77579904	11.72591362

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	65.16437971	65.16437971	20.66	0.0001
DIR	1	56.55995236	56.55995236	17.94	0.0001
FLAG*DIR	1	6.88728659	6.88728659	2.18	0.1405
PER	2	825.33618643	412.66809321	130.86	0.0001
FLAG*PER	2	87.28360961	43.64180480	13.84	0.0001
DIR*PER	2	168.27956110	84.13978055	26.68	0.0001
FLAG*DIR*PER	2	70.83440068	35.41720034	11.23	0.0001

Dependent Variable: MAJOR

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	221.10850685	20.10077335	33.37	0.0001
Error	289	174.06290178	0.60229378		
Corrected Total	300	395.17140864			

R-Square	C.V.	Root MSE	MAJOR Mean
0.559526	10.09494	0.77607588	7.68777409

Source	DF	Type III SS	Mean Square	F Value	Pr > F
FLAG	1	17.70798425	17.70798425	29.40	0.0001
DIR	1	6.47287254	6.47287254	10.75	0.0012
FLAG*DIR	1	0.89309307	0.89309307	1.48	0.2243
PER	2	161.76861678	80.88430839	134.29	0.0001
FLAG*PER	2	12.98533177	6.49266588	10.78	0.0001
DIR*PER	2	35.13534339	17.56767169	29.17	0.0001
FLAG*DIR*PER	2	10.53802997	5.26901498	8.75	0.0002

The SAS System

---------- DIR=1 PER=1 FLAG=1 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	26	31.7692308	20.3495606	1.0000000	65.0000000
CAR	26	1.8846154	0.7656068	1.0000000	3.0000000
DAY	26	2.1153846	0.8638020	1.0000000	3.0000000
ISEQ	26	2.1923077	1.0205579	1.0000000	4.0000000
SPD	26	45.3973077	4.1782576	34.8400000	54.3300000
STOPS	26	6.5757692	1.4826656	4.5800000	10.4500000
DELAY	26	333.7338462	73.1723613	204.1000000	553.1900000
FUEL	26	1.1538462	0.0754229	1.0500000	1.3600000
HC	26	1.1730769	0.1139041	1.0100000	1.3900000
CO	26	15.3565385	0.4371814	14.3700000	16.0700000
NOX	26	3.1250000	0.6059851	2.1900000	4.2500000
CRASH	26	24.7811538	2.3551260	20.6500000	31.8200000
INJURY	26	11.9026923	1.0992782	9.9900000	15.1800000
FATAL	26	0.1034615	0.0056159	0.1000000	0.1200000
MINOR	26	1.2315385	0.0571099	1.1100000	1.3200000
MOD	26	10.9373077	1.3535274	8.4700000	15.0600000
MAJOR	26	7.4119231	0.5798484	6.4700000	9.0500000

---------- DIR=1 PER=1 FLAG=2 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	29	38.6896552	24.3561424	1.0000000	76.0000000
CAR	29	2.0000000	0.8017837	1.0000000	3.0000000
DAY	29	2.0689655	0.8422349	1.0000000	3.0000000
ISEQ	29	2.1724138	1.0024600	1.0000000	4.0000000
SPD	29	47.8706897	4.5534155	36.8600000	55.8500000
STOPS	29	6.4272414	1.2470104	3.8700000	8.9200000
DELAY	29	294.9693103	70.3986206	187.7700000	497.1500000
FUEL	29	1.1324138	0.0702371	1.0000000	1.3000000
HC	29	1.1689655	0.1139970	0.9800000	1.4100000
CO	29	15.4431034	0.4412086	14.6300000	16.1700000
NOX	29	3.0000000	0.4341905	2.2600000	3.8100000
CRASH	29	23.5444828	2.2316259	20.1300000	29.9300000
INJURY	29	11.3086207	1.0424652	9.7400000	14.2800000
FATAL	29	0.1013793	0.0044111	0.0900000	0.1100000
MINOR	29	1.1875862	0.0549451	1.0700000	1.3000000
MOD	29	10.3524138	1.2603703	8.2500000	14.1800000
MAJOR	29	7.0631034	0.5576040	6.1700000	8.5200000

The SAS System

DIR=1 PER=2 FLAG=1

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	26	39.5000000	21.6152724	4.0000000	69.0000000
CAR	26	2.1538462	0.7844645	1.0000000	3.0000000
DAY	26	1.8846154	0.8161825	1.0000000	3.0000000
ISEQ	26	2.1538462	0.9671528	1.0000000	4.0000000
SPD	26	43.5515385	3.8038178	37.0100000	49.8600000
STOPS	26	6.6196154	0.9937625	4.5300000	8.5900000
DELAY	26	363.5188462	73.0258915	209.8700000	500.7800000
FUEL	26	1.1611538	0.0735569	1.0100000	1.3500000
HC	26	1.1738462	0.1226402	1.0600000	1.5400000
CO	26	15.1592308	0.6207925	12.8800000	16.1700000
NOX	26	3.0588462	0.6714184	2.3200000	4.8800000
CRASH	26	25.6496154	2.6460846	18.0800000	30.2600000
INJURY	26	12.3161538	1.2443443	8.7300000	14.4800000
FATAL	26	0.1050000	0.0070711	0.0800000	0.1100000
MINOR	26	1.2588462	0.0754892	0.9900000	1.3700000
MOD	26	11.3396154	1.3915473	7.5800000	13.7200000
MAJOR	26	7.6611538	0.6940221	5.5900000	8.8700000

DIR=1 PER=2 FLAG=2

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	27	42.9629630	23.2519337	4.0000000	79.0000000
CAR	27	2.0740741	0.7808243	1.0000000	3.0000000
DAY	27	1.9629630	0.8540168	1.0000000	3.0000000
ISEQ	27	2.1111111	0.9740215	1.0000000	4.0000000
SPD	27	45.9581481	4.2404336	38.7200000	53.1100000
STOPS	27	6.4444444	0.8462875	5.2600000	8.4000000
DELAY	27	324.1655556	71.1332960	217.7900000	459.2700000
FUEL	27	1.1548148	0.0558411	1.0600000	1.2500000
HC	27	1.1944444	0.0831280	1.0700000	1.3600000
CO	27	15.4859259	0.4122477	14.7800000	16.3700000
NOX	27	3.1577778	0.5158438	2.4700000	4.4800000
CRASH	27	24.4585185	2.3155772	21.0400000	28.9000000
INJURY	27	11.7462963	1.0799222	10.1700000	13.7900000
FATAL	27	0.1033333	0.0048038	0.1000000	0.1100000
MINOR	27	1.2162963	0.0520464	1.1300000	1.3200000
MOD	27	10.8088889	1.3282126	8.7900000	13.4800000
MAJOR	27	7.3103704	0.5663886	6.5200000	8.3100000

The SAS System

DIR=1 PER=3 FLAG=1

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	17	33.0588235	16.7237503	7.0000000	58.0000000
CAR	17	1.7647059	0.6642112	1.0000000	3.0000000
DAY	17	1.8823529	0.8574929	1.0000000	3.0000000
ISEQ	17	1.7647059	0.7524470	1.0000000	3.0000000
SPD	17	38.5305882	2.2702353	34.6800000	41.2700000
STOPS	17	7.2929412	0.9935716	5.7100000	9.0000000
DELAY	17	463.9123529	55.1521842	403.0800000	562.0300000
FUEL	17	1.2258824	0.0557964	1.1400000	1.3300000
HC	17	1.2323529	0.0998455	1.0900000	1.4400000
CO	17	15.4747059	0.4853880	14.9600000	16.4500000
NOX	17	3.1694118	0.5973218	2.4800000	4.4500000
CRASH	17	28.9623529	1.8214504	26.8800000	32.2100000
INJURY	17	13.8588235	0.8600645	12.8900000	15.3900000
FATAL	17	0.1117647	0.0039295	0.1100000	0.1200000
MINOR	17	1.3047059	0.0520958	1.2200000	1.4200000
MOD	17	13.2694118	0.9991088	11.9900000	15.0000000
MAJOR	17	8.4400000	0.4705582	7.8900000	9.3000000

DIR=1 PER=3 FLAG=2

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	26	43.1153846	24.4283883	7.0000000	82.0000000
CAR	26	1.9615385	0.8236878	1.0000000	3.0000000
DAY	26	2.0000000	0.8485281	1.0000000	3.0000000
ISEQ	26	1.9615385	0.8236878	1.0000000	3.0000000
SPD	26	41.0096154	3.3037052	33.0300000	46.9500000
STOPS	26	7.5365385	1.1089056	5.8100000	9.7000000
DELAY	26	413.3850000	71.4310143	303.2100000	608.8800000
FUEL	26	1.2188462	0.0655028	1.1200000	1.3900000
HC	26	1.2507692	0.1036889	1.0800000	1.4900000
CO	26	15.7296154	0.4660599	15.0400000	16.8100000
NOX	26	3.2730769	0.4688008	2.4400000	4.0400000
CRASH	26	27.3507692	2.3204102	23.8300000	33.6700000
INJURY	26	13.0884615	1.0909471	11.4300000	16.0500000
FATAL	26	0.1084615	0.0054349	0.1000000	0.1200000
MINOR	26	1.2546154	0.0631336	1.1100000	1.3700000
MOD	26	12.4765385	1.2479133	10.6100000	15.9300000
MAJOR	26	7.9965385	0.6049922	6.9500000	9.5800000

The SAS System

DIR=2 PER=1 FLAG=1

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	27	33.2962963	20.3768625	1.0000000	69.0000000
CAR	27	1.8148148	0.7862783	1.0000000	3.0000000
DAY	27	2.0000000	0.8770580	1.0000000	3.0000000
ISEQ	27	2.2222222	1.0127394	1.0000000	4.0000000
SPD	27	47.4581481	4.2681549	37.9800000	55.2800000
STOPS	27	6.4044444	1.1242821	4.4700000	8.7700000
DELAY	27	300.0814815	69.4261411	192.8400000	472.7300000
FUEL	27	1.1448148	0.0644724	1.0500000	1.2800000
HC	27	1.1877778	0.1026320	1.0400000	1.3800000
CO	27	15.5518519	0.5056834	14.6700000	16.3700000
NOX	27	3.1811111	0.4861571	2.5100000	4.0300000
CRASH	27	23.6711111	2.2417976	20.2600000	29.2200000
INJURY	27	11.3696296	1.0448573	9.6900000	13.9300000
FATAL	27	0.1007407	0.0047442	0.0900000	0.1100000
MINOR	27	1.1870370	0.0610053	0.9900000	1.2800000
MOD	27	10.4511111	1.3148569	8.4400000	13.8400000
MAJOR	27	7.0814815	0.5486466	5.9300000	8.3200000

DIR=2 PER=1 FLAG=2

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	27	35.0000000	22.6495033	1.0000000	72.0000000
CAR	27	1.8518519	0.8182394	1.0000000	3.0000000
DAY	27	2.0000000	0.8320503	1.0000000	3.0000000
ISEQ	27	2.0740741	0.9577990	1.0000000	4.0000000
SPD	27	48.2292593	4.7627448	33.1300000	56.4700000
STOPS	27	6.3588889	1.0110213	4.7500000	8.6800000
DELAY	27	289.8337037	85.0705491	180.0200000	622.7400000
FUEL	27	1.1370370	0.0721011	1.0500000	1.3700000
HC	27	1.1896296	0.1072553	1.0400000	1.4900000
CO	27	15.6377778	0.5269092	14.5700000	17.1000000
NOX	27	3.0651852	0.4496868	2.4700000	4.3500000
CRASH	27	23.3025926	2.8212526	19.8700000	34.5100000
INJURY	27	11.1833333	1.3257799	9.5500000	16.4300000
FATAL	27	0.1000000	0.0055470	0.0900000	0.1200000
MINOR	27	1.1529630	0.0754889	1.0300000	1.3600000
MOD	27	10.3955556	1.5345416	8.7400000	16.6600000
MAJOR	27	6.9259259	0.7263145	5.9700000	9.6800000

The SAS System

DIR=2 PER=2 FLAG=1

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	27	41.0370370	22.7975732	4.0000000	72.0000000
CAR	27	2.0740741	0.8286191	1.0000000	3.0000000
DAY	27	1.8148148	0.7862783	1.0000000	3.0000000
ISEQ	27	2.2222222	1.0127394	1.0000000	4.0000000
SPD	27	46.9074074	5.3126870	35.9800000	56.2300000
STOPS	27	6.1874074	1.3848371	3.3000000	8.3900000
DELAY	27	311.8896296	89.1512897	180.6200000	523.1500000
FUEL	27	1.1437037	0.0823290	1.0200000	1.2800000
HC	27	1.1674074	0.1286795	1.0100000	1.5000000
CO	27	15.2796296	0.4108292	14.5800000	16.0600000
NOX	27	3.1262963	0.7068084	2.3600000	4.7900000
CRASH	27	24.0418519	2.8706781	19.7400000	30.9700000
INJURY	27	11.5562963	1.3410018	9.5100000	14.8100000
FATAL	27	0.1025926	0.0065590	0.0900000	0.1200000
MINOR	27	1.2177778	0.0557007	1.1000000	1.3600000
MOD	27	10.5196296	1.6156291	8.3300000	14.3000000
MAJOR	27	7.2322222	0.7036298	6.0900000	8.9700000

DIR=2 PER=2 FLAG=2

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	26	40.8076923	23.1067423	5.0000000	75.0000000
CAR	26	1.9615385	0.8236878	1.0000000	3.0000000
DAY	26	2.0000000	0.8485281	1.0000000	3.0000000
ISEQ	26	2.0000000	0.8944272	1.0000000	4.0000000
SPD	26	45.4126923	5.6021457	33.8700000	54.7600000
STOPS	26	6.5876923	1.2367613	3.7800000	9.0600000
DELAY	26	337.0000000	98.6350001	198.1600000	584.7400000
FUEL	26	1.1726923	0.0785650	1.0300000	1.3200000
HC	26	1.2196154	0.0961449	0.9900000	1.3700000
CO	26	15.6380769	0.3153033	14.8200000	16.1600000
NOX	26	3.2238462	0.3889481	2.3100000	3.8900000
CRASH	26	24.8161538	3.1876086	20.3900000	32.9200000
INJURY	26	11.9023077	1.4961372	9.8400000	15.7300000
FATAL	26	0.1026923	0.0066679	0.0900000	0.1200000
MINOR	26	1.2019231	0.0761587	1.0500000	1.4000000
MOD	26	11.1130769	1.7439765	8.5600000	15.3300000
MAJOR	26	7.3530769	0.8103223	6.1900000	9.4800000

The SAS System

DIR=2 PER=3 FLAG=1

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	18	34.5000000	18.6050278	8.0000000	63.0000000
CAR	18	1.6666667	0.7669650	1.0000000	3.0000000
DAY	18	1.8333333	0.8574929	1.0000000	3.0000000
ISEQ	18	1.8333333	0.7859052	1.0000000	3.0000000
SPD	18	30.4772222	4.8589648	23.9900000	41.1300000
STOPS	18	10.0027778	1.3293643	7.3300000	11.5600000
DELAY	18	722.0683333	174.9818965	407.1100000	1004.00
FUEL	18	1.4083333	0.0924344	1.2200000	1.5700000
HC	18	1.4000000	0.0873802	1.2000000	1.5600000
CO	18	16.0800000	0.3504115	15.5100000	16.5800000
NOX	18	3.4500000	0.3738826	2.9100000	4.2300000
CRASH	18	37.3538889	5.6795206	27.2100000	46.5600000
INJURY	18	17.7644444	2.6554898	13.0200000	22.0900000
FATAL	18	0.1261111	0.0128973	0.1000000	0.1500000
MINOR	18	1.4111111	0.0931090	1.2700000	1.5900000
MOD	18	18.1294444	3.2506406	12.2600000	23.2300000
MAJOR	18	10.4216667	1.3633016	8.0200000	12.7000000

DIR=2 PER=3 FLAG=2

Variable	N	Mean	Std Dev	Minimum	Maximum
SEQ	25	43.0000000	22.3196475	9.0000000	78.0000000
CAR	25	1.9200000	0.8124038	1.0000000	3.0000000
DAY	25	2.0400000	0.8406347	1.0000000	3.0000000
ISEQ	25	1.9200000	0.8124038	1.0000000	3.0000000
SPD	25	38.2140000	6.0931033	25.1500000	46.4800000
STOPS	25	8.1684000	1.1994884	6.2700000	10.4300000
DELAY	25	493.4676000	170.0602175	305.8500000	916.6600000
FUEL	25	1.2712000	0.1049333	1.1400000	1.5400000
HC	25	1.2900000	0.1149275	1.1100000	1.5400000
CO	25	15.6328000	0.4825326	14.7900000	16.5200000
NOX	25	3.2936000	0.4748410	2.3800000	4.3100000
CRASH	25	29.9108000	5.5141046	23.7000000	43.4100000
INJURY	25	14.2888000	2.5737753	11.4100000	20.6000000
FATAL	25	0.1116000	0.0117898	0.1000000	0.1400000
MINOR	25	1.3024000	0.0851606	1.1800000	1.4800000
MOD	25	13.8444000	3.1765903	10.1400000	21.6800000
MAJOR	25	8.6512000	1.3141801	7.1200000	11.8300000

C.8 Simulation Output

The INTEGRATION summary files are presented below. Two summary files refer to before signal coordination and after signal coordination conditions for the road network of Phoenix, Arizona (described in chapter 6).

C.8.1 Summary1.out

Before Scenario

1	123961	0	0	0	0	123961 - vehicles
2	67204328	0	0	0	0	67204328 - veh-secs
3	493410	0	0	0	0	493410 - veh-km
4	528153	0	0	0	0	528153 - veh-stops
5	0	0	0	0	0	0 - wrng turn
6	82441	0	0	0	0	82441 - fuel (l)
7	1250482	0	0	0	0	1250482 - HC (g)
8	8520539	0	0	0	0	8520539 - CO (g)
9	205691	0	0	0	0	205691 - NO (g)
10	1281017	0	0	0	0	1281017 - acc* 10e6
11	38096212	0	0	0	0	38096212 - tot delay
12	22248634	0	0	0	0	22248634 - stp delay
13	15847670	0	0	0	0	15847670 - ac/dc del
14	0	0	0	0	0	0 - dollars
15	123961	0	0	0	0	123961 - persons
16	67204328	0	0	0	0	67204328 - per-hrs
17	493410	0	0	0	0	493410 - per-km
18	-2147483648	0	0	0	0	-2147483648 - acc-noise
19	0	0	0	0	0	0
20	0	0	0	0	0	0

1	1.000	0.000	0.000	0.000	0.000	1.000 - vehicles
2	542.141	0.000	0.000	0.000	0.000	542.141 - veh-secs
3	3.980	0.000	0.000	0.000	0.000	3.980 - veh-km
4	4.261	0.000	0.000	0.000	0.000	4.261 - veh-stops
5	0.000	0.000	0.000	0.000	0.000	0.000 - wrng turn
6	0.665	0.000	0.000	0.000	0.000	0.665 - fuel (l)
7	10.088	0.000	0.000	0.000	0.000	10.088 - HC (g)
8	68.736	0.000	0.000	0.000	0.000	68.736 - CO (g)
9	1.659	0.000	0.000	0.000	0.000	1.659 - NO (g)
10	**10.334**	**0.000**	**0.000**	**0.000**	**0.000**	**10.334 - acc* 10e6**
11	307.324	0.000	0.000	0.000	0.000	307.324 - tot delay
12	179.481	0.000	0.000	0.000	0.000	179.481 - stp delay
13	127.844	0.000	0.000	0.000	0.000	127.844 - ac/dc del
14	0.000	0.000	0.000	0.000	0.000	0.000 - dollars
15	1.000	0.000	0.000	0.000	0.000	1.000 - persons
16	542.141	0.000	0.000	0.000	0.000	542.141 - per-hrs
17	3.980	0.000	0.000	0.000	0.000	3.980 - per-km
18	117004.891	0.000	0.000	0.000	0.000	117004.891 - acc-noise
19	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000

C.8.2 Summary2.out

After Scenario

1	123961	0	0	0	0	123961	-vehicles
2	62416856	0	0	0	0	62416856	veh-secs
3	493079	0	0	0	0	493079	-veh-km
4	527437	0	0	0	0	527437	-veh-stops
5	0	0	0	0	0	0	-wrng turn
6	80540	0	0	0	0	80540	-fuel (l)
7	1218181	0	0	0	0	1218181	-HC (g)
8	8325895	0	0	0	0	8325895	-CO (g)
9	204130	0	0	0	0	204130	-NO (g)
10	1219053	0	0	0	0	1219053	-acc* 10e6
11	35034584	0	0	0	0	35034584	-tot delay
12	19800048	0	0	0	0	19800048	-stp delay
13	15234769	0	0	0	0	15234769	-ac/dc del
14	0	0	0	0	0	0	-dollars
15	123961	0	0	0	0	123961	-persons
16	62416856	0	0	0	0	62416856	-per-hrs
17	493079	0	0	0	0	493079	-per-km
18	-2147483648	0	0	0	0	-2147483648	-acc-noise
19	0	0	0	0	0	0	
20	0	0	0	0	0	0	

1	1	0	0	0	0	1	-vehicles
2	503.52	0	0	0	0	503.52	-veh-secs
3	3.978	0	0	0	0	3.978	-veh-km
4	4.255	0	0	0	0	4.255	-veh-stops
5	0	0	0	0	0	0	-wrng turn
6	0.65	0	0	0	0	0.65	-fuel (l)
7	9.827	0	0	0	0	9.827	-HC (g)
8	67.165	0	0	0	0	67.165	-CO (g)
9	1.647	0	0	0	0	1.647	-NO (g)
10	**9.834**	**0**	**0**	**0**	**0**	**9.834**	**-acc* 10e6**
11	282.626	0	0	0	0	282.626	-tot delay
12	159.728	0	0	0	0	159.728	-stp delay
13	122.9	0	0	0	0	122.9	-ac/dc del
14	0	0	0	0	0	0	-dollars
15	1	0	0	0	0	1	-persons
16	503.52	0	0	0	0	503.52	-per-hrs
17	3.978	0	0	0	0	3.978	-per-km
18	115317.063	0	0	0	0	115317.063	-acc-noise
19	0	0	0	0	0	0	
20	0	0	0	0	0	0	