

## APPENDIX A

Appendix A1 contains a listing of the program ACPD.NEW, written in the SAS language, version 82.4, which is used to calculate accident and severity predictions. Appendix A2 shows the variable dictionary for the input SAS data set.

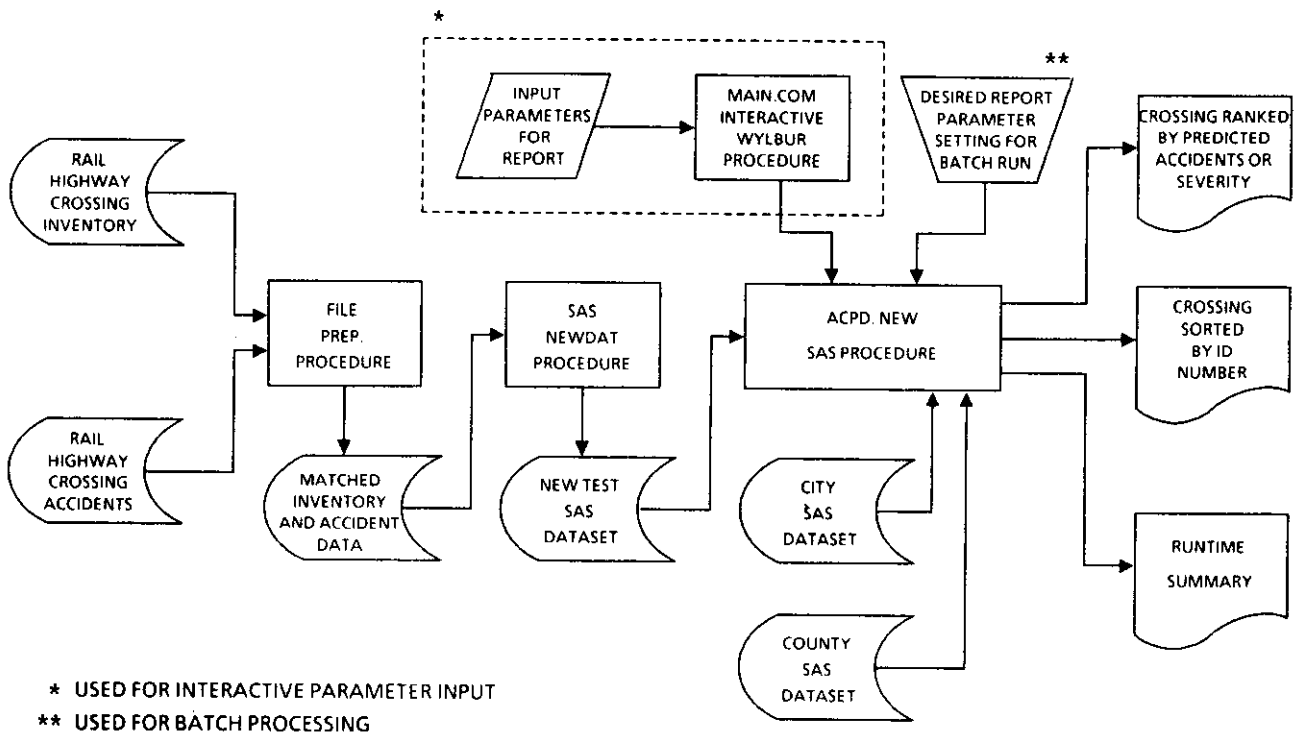


FIGURE A-1. DATA FLOW FOR ACCIDENT OR SEVERITY PREDICTION

NOTE: THE SAS PROCEDURE NEWDAT IS GIVEN IN APPENDIX A2.

APPENDIX A1

LISTING OF PROGRAM ACPD.NEW

```

//
//JOBCARD
//
//PROCLIB DD DSN=ZABCRUN.PROCLIB,DISP=SHR
//A EXEC SAS,REGION=900K
//DD1 DD SYSOUT=A
//FINALL DD DSN=WTP1FZU.NEWTEST,DISP=(OLD,KEEP),UNIT=FILE,
// VOL=SER=FRASIR
//FILEB DD DSN=WTP1FZU.CITY,DISP=(OLD,KEEP),UNIT=FILE,
// VOL=SER=FRASIR
//FILEC DD DSN=WTP1FZU.COUNTY,DISP=(OLD,KEEP),UNIT=FILE,
// VOL=SER=FRASIR
//SYSIN DD *
DATA TRIM;
SET FINALL.NEWTEST;
*****
* THIS PROGRAM IS CALLED BY THE MAIN.COM PROCEDURE
* TO GENERATE REPORT FOR ACCIDENT PREDICTION. HOWEVER
* BY SPECIFYING THE VALUES OF FOLLOWING VARIABLES, IT
* CAN BE RUN INDEPENDENTLY IN BATCH MODE.

SATEVAL          = TWO DIGIT STATE CODE
COUNTVAL        = THREE DIGIT COUNTY CODE
CITYVAL          = FOUR DIGIT CODE FOR CITY
RAILVAL          = FOUR CHARACTER CODE FOR RAILROAD
ID1VAL           = SIX DIGIT NUMERIC CODE FOR THE FIRST
                  CROSSING ID
ID2VAL           = SIX DIGIT NUMERIC CODE FOR THE FINAL
                  CROSSING ID
SELVAL           = 1 -FOR ACCIDENT PREDICTION
                  2 -FOR RESOURCE ALLOCATION
ACCVAL           = 1 -PREDICTED ACCIDENTS
                  2 -FATAL ACCIDENTS
                  3 -COMBINED CASUALTY INDEX
OPTVAL           = 1 -STANDARD EFFECTIVENESS
                  2 -EXTENDED EFFECTIVENESS
C1 - C3          = THREE VALUES OF UPGRADE COSTS
S1 - S3          = THREE VALUES OF STANDARD EFFECTIVENESS
X1 - X12         = TWELVE VALUES OF EXTENDED EFFECTIVENESS
KK               = FATALITY FACTOR
NN               = NUMBER OF RANKED CROSSINGS TO BE PRINTED
BUDGETX          = AVAILABLE BUDGET IN DOLLARS
TITVAL           = A CHARACTER STRING OF THE TITLE TO BE PRINTED
                  AT THE TOP OF EACH PAGE IN THE REPORT

```

IF ANY OF THE VARIABLE DOES NOT HAVE ANY SPECIFIC VALUE  
IT IS ASSIGNED A MISSING VALUE OF PERIOD (.)

199

69.1  
29.2  
0.3

\*\*\*\*\*;

MACRO CROSSBK ~~.8644~~ %; .9417  
MACRO FLASHLK .8887 %; .8345  
MACRO GATESK ~~.8121~~ %; .8901

ISTATE= STATEVAL;  
ICOUNTY= COUNTVAL;  
ICITY= CITYVAL;  
IRAIL= 'RAILVAL';  
ID1= ID1VAL;  
ID2= ID2VAL;  
IF ISTATE NE . THEN DO ;  
IF STATE NE ISTATE THEN DELETE; END;  
IF ICOUNTY NE . THEN DO;  
IF CONTY NE ICOUNTY THEN DELETE; END;  
IF ICITY NE . THEN DO;  
IF CITY NE ICITY THEN DELETE; END;  
IF IRAIL NE '.' THEN DO;  
IF RAILROAD NE IRAIL THEN DELETE; END;  
IF (ID1 > 0 ) THEN DO;  
IF INTID < ID1 THEN DELETE; END;  
IF (ID2 > 0 ) THEN DO;  
IF INTID > ID2 THEN DELETE; END;

\*  
\* ;

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CLASS=NEWCL;  
IF CHANGE Y > 80 THEN CLASS= OLDCL;  
IF OLDCL > 8 THEN CLASS = NEWCL;

\*\*\*\*\*;  
\* GET TOTAL NUMBER OF CROSSINGS BEING ANALYZED  
\*\*\*\*\*;

TRACKS=MTRKS+OTRKS;  
DROP ISTATE ICOUNTY ICITY IRAIL ID1 ID2 INTID FCL;  
PROC MEANS NOPRINT;  
OUTPUT OUT=TOTREC N= NUM\_CRO;

\*\*\*\*\*

\*  
\* COMPUTE H VALUE FOR DIFFERENT CLASS TYPE  
\*

\*\*\*\*\*;  
\*\*\*\*\*

\*  
\* BASIC CALCULATION FOR PASSIVE  
\*

\*\*\*\*\*;

DATA ICROSS;  
SET TRIM;

\*  
\* DELETE ALL NON PASSIVE CROSSINGS;  
\*

IF (CLASS > 4) THEN DELETE;  
H= .0006938\*(((AADT\*TRAINS +0.2)/.2)\*\*.37)\*  
(((DAYTHRU + 0.2)/0.2)\*\*0.178)\*  
(EXP (0.0077\*MXTTSP))\*  
(EXP (-0.5966\*(PAVED-1)));

```

*****
*
*   BASIC FLASHING LIGHTS CALCULATION
*
*****;
DATA IFLASH;
SET TRIM;
IF (CLASS < 5 OR CLASS > 7 ) THEN DELETE;
H= .0003351*((AADT*TRAINS + 0.2)/0.2)** 0.4106)*
      (((DAYTHRU +0.2)/0.2)**0.1131)*
      (EXP (0.1917*MTRKS))*
      (EXP (0.1826*(TRAFLN - 1))) ;
*****
*
*   BASIC GATES CALCULATIONS
*
*****;
DATA IGATE;
SET TRIM;
IF (CLASS NE 8) THEN DELETE;
H= .0005745*((AADT*TRAINS + 0.2)/0.2)** 0.2942)*
      (((DAYTHRU +0.2)/0.2)**0.1781)*
      (EXP (0.1512*MTRKS))*
      (EXP (0.1420*(TRAFLN - 1))) ;
*****;
*
*   MERGING OF THREE SETS BY CROSSINGS AND USING EFFECTIVENESS
*
*****;
DATA XING;
SET IGATE IFLASH ICROSS;
BY CROSSING;
ARRAY UP UP1-UP3;
ARRAY DN DN1-DN3;
ARRAY UPDN(K) UP1-UP3 DN1-DN3;
UP1= 1-S1;    UP2= 1-S2;    UP3= 1-S3;
DO OVER UP;
DN = 1/UP;
END;
*
*
IF CLASS = NEWCL THEN GO TO LAB1;
IF (OLDCL LT NEWCL) THEN DO;
    K=2;
    IF(NEWCL NE 8) THEN K= 1;
    IF(OLDCL GT 4) THEN K= 3;
END;
IF (OLDCL GT NEWCL) THEN DO;
    K=5;
    IF (OLDCL NE 8) THEN K=4;
    IF(NEWCL > 4) THEN K=6;
END;
H=H*UPDN;
*****

```

\*  
\* CALCULATIONS FOR PREDICTED ACCIDENTS  
\*

\*\*\*\*\*;  
LAB1:

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CURYEAR= 85;  
TA= CURYEAR-CHANGE\_Y;  
IF TA < 0 THEN TA= 0;  
IF TA > 5 THEN TA = 5;  
NACC= ACC1+ACC2+ACC3+ACC4+ACC5;  
THRU=DAYTHRU+NGTTHRU;  
SWITCH=DAYSWT+NGTSWT;  
T0=1./(.05+H);  
A=(H\*T0 + NACC)/(TA + T0);  
CLASS = NEWCL;  
IF CLASS LE 4 THEN A= CROSSBK\*A;  
ELSE IF (4 < CLASS < 8) THEN A= FLASHLK\*A;  
ELSE A= GATESK\*A;  
DROP NACC TA TO UP1-UP3 DN1-DN3 K TRAINS ;

\*\*\*\*\*

\*  
\* CALCULATIONS FOR FATAL ACCIDENTS  
\*

\*\*\*\*\*;

ACCD= ACCVAL;  
IF ACCD > 1 THEN DO;  
MS= MXTTSP\*\*(-.9981);  
TT= (1+THRU)\*\*(-0.0872);  
TS= (1+SWITCH)\*\*0.0872;  
UR= EXP(0.3571\*FC10);  
FATPRB=1/(1. + (440.9\*MS\*TT\*TS\*UR));  
FATAL=FATPRB\*A;  
DROP MS TT TS FATPRB;

\*\*\*\*\*

\*  
\* CALCULATIONS FOR CASUALTY ACCIDENTS  
\*

\*\*\*\*\*;

IF ACCD = 3 THEN DO;  
MS=MXTTSP\*\*(-0.343);  
TRK=0.1153\*TRACKS;  
TK=EXP(TRK);  
URB=0.2960\*FC10;  
UR=EXP(URB);  
CASPRB=1.0/(1+(4.481\*MS\*TK\*UR));  
CAS= CASPRB\*A;  
COMCAS= (KK- 1)\*FATAL+ CAS;  
DROP TRK TK UR CASPRB CAS;

END; END;  
IF ACCD= 1 THEN ACCIDENT= A;  
ELSE IF ACCD= 2 THEN ACCIDENT = FATAL;  
ELSE ACCIDENT= COMCAS;  
DROP A COMCAS FATAL;

\*\*\*\*\*;

```

*      REPORT GENERATION PROGRAM BEGINS      ;
* DESCRIPTION OF COUNTY AND CITY IS ADDED TO EACH ;
* RECORD TO BE INCLUDED IN THE RANK LISTING ;
*****;
DATA DATA1;
SET XING;
RENAME CONTY=COUNTY_C CITY=CITY_C;
PROC SORT;
BY STATE COUNTY_C ;
DATA DATA1B;
MERGE DATA1A(IN=A) FILEC.COUNTY ;
BY STATE COUNTY_C ;
IF A;
PROC SORT;
BY STATE CITY_C;
DATA DATA1C;
MERGE DATA1B(IN=A) FILEB.CITY;
BY STATE CITY_C;
IF A;
DSTATE= 0; DPAVED= 0;
DSTATE= STATE; DPAVED= PAVED;
*****
* COMBINING CHANGE MONTH & YEAR ATTRIBUTES
*****;
MONYEAR= 100*CHANGE_Y +CHANGE_M;
DROP STATE;
PROC SORT;
BY DESCENDING ACCIDENT;
DATA DATA2;
SET DATA1C;
IF _N_ > NN THEN STOP;
PROC MEANS NOPRINT;
VAR ACCIDENT;
OUTPUT OUT=SUMACC SUM=TOTACC;
MACRO LABEL1
LABEL DSTATE=ST DPAVED= HWY*PVD
CROSSING=XING*ID*# RAILROAD=RR
ACC1=-->*___*81 ACC2=NUM*___*82
ACC3=OF*___*83 ACC4=ACC*___*84
ACC5=<--*___*85 MONYEAR=DATE*OF*CHG
CLASS=WD*CL SWITCH=TOTL*SWIT*TRNS
DAYTHRU=DAY*THRU*TRNS
THRU=TOTL*THRU*TRNS
TRACKS=TOTL*TRKS MTRKS=MAIN*TRKS
MXTTSP=TTBL*SPD TRAFLN=HWY*LNS
FC10=URBN*RURL ACCIDENT=PRED*ACCDS
COT_NAME=COUNTY CTY_NAME=CITY %;
*****;
* DEFINE FORMATS TO BE USED FOR PRINTING VALUES ;
*****;
PROC FORMAT;
VALUE ESTATE 1='AL' 2='AK' 3=' ' 4='AZ'
5='AR' 6='CA' 7=' ' 8='CO'
9='CT' 10='DE' 11='DC' 12='FL'

```

253  
254  
255

17='IL'	18='IN'	19='IA'	20='ND'
21='KY'	22='LA'	23='ME'	24='MD'
25='MA'	26='MI'	27='MN'	28='MO'
29='MO'	30='MT'	31='NE'	32='NV'
33='NH'	34='NJ'	35='NM'	36='NY'
37='NC'	38='ND'	39='OH'	40='OK'
41='OR'	42='PA'	43='PR'	44='RI'
45='SC'	46='SD'	47='TN'	48='TX'
49='UT'	50='VT'	51='VA'	52='VI'
53='WA'	54='WV'	55='WI'	56='WY'

VALUE IPAVED 1= YES  
2= NO;

PICTURE PREDACC OTHER='9.999999';  
PICTURE ICHANGE 0-8012=' ' ;  
OTHER='99-99' ;

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\*\*\*\*\*  
\* REPORT PRINTING PROCEDURE FOR \*  
\* SEVERITY TYPE = PREDICTED ACCIDENTS \*  
\*\*\*\*\*;

DATA BASIC;

LABEL1 ;

SET DATA2;

IF ACCD NE 1 THEN STOP;

RETAIN RANK 0; RANK = RANK +1;

POT 1982

299.7

PROC PRINT SPLIT=\*;

FORMAT DSTATE ESTATE. MONYEAR ICHANGE.;

FORMAT DPAVED IPAVED. ACCIDENT PREDACC.;

ID RANK;

VAR ACCIDENT CROSSING DSTATE RAILROAD ACC1 ACC2 ACC3 ACC4 ACC5

MONYEAR CLASS SWITCH DAYTHRU THRU TRACKS MTRKS MXTTSP

DPAVED TRAF LN FC10 AADT;

TITLE1 TITVAL;

TITLE2 PUBLIC RAIL-HIGHWAY CROSSINGS;

TITLE3 RANKED BY PREDICTED ACCIDENTS PER YEAR;

PROC SORT DATA= BASIC;

BY CROSSING;

PROC PRINT SPLIT=\*;

FORMAT DSTATE ESTATE. ACCIDENT PREDACC.;

VAR CROSSING ACCIDENT RANK DSTATE COT\_NAME CTY\_NAME RAILROAD

ROAD RRID MILEPOST;

TITLE4 SORTED BY CROSSING ID;

\*\*\*\*\*

\* REPORT PRINTING PROCEDURE FOR

\* SEVERITY = FATAL ACCIDENTS

\*\*\*\*\*;

DATA FATAL;

LABEL1 ;

SET DATA2;

IF ACCD NE 2 THEN STOP;

RETAIN RANK 0; RANK=RANK+1;

PROC PRINT SPLIT=\*;

FORMAT DSTATE ESTATE. MONYEAR ICHANGE.;

FORMAT DPAVED IPAVED. ACCIDENT PREDACC.;

```

ID RANK;
VAR ACCIDENT CROSSING DSTATE RAILROAD ACC1 ACC2 ACC3 ACC4 ACC5
MONYEAR CLASS SWITCH DAYTHRU THRU TRACKS MTRKS MXTTSP
DPAVED TRAF LN FC10 AADT;
TITLE1 TITVAL;
TITLE2 PUBLIC RAIL-HIGHWAY CROSSINGS;
TITLE3 RANKED BY PREDICTED FATAL ACCIDENTS PER YEAR;
PROC SORT DATA= FATAL;
BY CROSSING;
PROC PRINT SPLIT=*;
FORMAT DSTATE ESTATE. ACCIDENT PREDACC.;
VAR CROSSING ACCIDENT RANK DSTATE COT_NAME CTY_NAME RAILROAD
ROAD RRID MILEPOST;
TITLE4 SORTED BY CROSSING ID;
*****
* REPORT PRINTING PROCEDURE FOR
* SEVERITY = COMBINED CASUALTY
*****;
DATA CCI;
LABEL1 ;
SET DATA2;
IF ACCD NE 3 THEN STOP;
RETAIN RANK 0; RANK=RANK+1;
PROC PRINT SPLIT=*;
FORMAT DSTATE ESTATE. MONYEAR ICHANGE.;
FORMAT DPAVED IPAVED. ACCIDENT PREDACC.;
ID RANK;
VAR ACCIDENT CROSSING DSTATE RAILROAD ACC1 ACC2 ACC3 ACC4 ACC5
MONYEAR CLASS SWITCH DAYTHRU THRU TRACKS MTRKS MXTTSP
DPAVED TRAF LN FC10 AADT;
TITLE1 TITVAL;
TITLE2 PUBLIC RAIL-HIGHWAY CROSSINGS;
TITLE3 RANKED BY PREDICTED COMBINED CASUALTY INDEX (CCI);
PROC SORT DATA= CCI;
BY CROSSING;
PROC PRINT SPLIT=*;
FORMAT DSTATE ESTATE. ACCIDENT PREDACC.;
VAR CROSSING ACCIDENT RANK DSTATE COT_NAME CTY_NAME RAILROAD
ROAD RRID MILEPOST;
TITLE4 SORTED BY CROSSING ID;
*****
* PROCEDURE FOR PRINTING SUMMARY PAGE
*****;
DATA SUMMRY;
MERGE TOTREC SUMACC;
FILE DD1, PRINT;
N N = NN;
ACCD= ACCVAL;
ID1= ID1VAL; ID2= ID2VAL;
IF ID1 = 0 THEN DO;
ID1= .; ID2= .; END;
PUT
///@36'*****
*';

```



```

PUT @36 '*          SUMMARY OF INPUT  PARAMETERS
*';
PUT @36 '*          FOR ACCIDENT AND SEVERITY PREDICTION
*';
PUT @36
'*****';
PUT /@36 '          TITLE           : TITVAL  ';
PUT @36 '          STATE           : STATEVAL  ';
PUT @36 '          COUNTY          : COUNTVAL  ';
PUT @36 '          CITY            : CITYVAL   ';
PUT @36 '          RAILROAD         : RAILVAL   ';
PUT @36 '          CROSSING ID      :           ';
PUT @36 '          BOTTOM OF RANGE : ' ID1;
PUT @36 '          TOP OF RANGE  : ' ID2;
PUT @36 '          RECORDS TO BE : ' ;
IF N_N < 195000 THEN
PUT @36 '          PRINTED       : NN  ';
ELSE
PUT @36 '          PRINTED       : ALL  ';
PUT @36 '          SEVERITY TYPE   : ACCVAL   (1) PREDICTED
ACCIDENTS';
PUT @36 '          :           (2) FATAL ACCIDENT';
PUT @36 '          :           (3) COMBIN. CASUALTY
INDEX';
IF ACCD = 3 THEN
PUT @36 '          FATALITY FACTOR : KK  ';
PUT
//@36'*****';
PUT //@36 '          SUM OF PREDICTED ACCIDENTS           :'
          TOTACC;
PUT /@36 '          TOTAL NUMBER OF CROSSINGS ANALYZED :'
          NUM_CRO;
402 PUT /@36 '          INVENTORY DATE: APRIL 1986';
PUT
//@36'*****';
TITLE1 TITVAL;

```

APPENDIX A2

LISTING OF NEWDAT PROCEDURE

```
//
//JOBCARD
//
//PROCLIB DD DSN=ZABCRUN.PROCLIB,DISP=SHR
//A EXEC SAS,REGION=900K
//FILEB DD DSN=WTP1FZU.NEWTEST,DISP=(NEW,KEEP),UNIT=FILE,
// VOL=SER=FRASIR,SPACE=(TRK,(150,10),RLSE)
//FILEA DD DSN=WTP1FZZ.SEV.INDEX,DISP=SHR,UNIT=MSS
//SYSIN DD *
*****
* THIS PROCEDURE IS USED TO CREATE SAS DATASET NEWTEST FROM
* MATCHED ACCIDENT AND INVENTORY DATA. THE DATA SET IS USED BY
* BOTH ACPD.NEW AND RESAL.NEW PROGRAMS.
*****;
DATA FILEB.NEWTEST;
INFILE FILEA;
INPUT
CROSSING $ 1-7          STATE      $ 8-9
INTID      1-6
CONTY     $ 10-12      CITY       $ 13-16
RAILROAD  $ 17-20      CHANGE_Y   21-22
CHANGE_M   23-24      ROAD       $ 25-41
RRID      $ 42-51      MILEPOST  $ 52-57
OLDCL           58      NEWCL           59
STOP         60      NGTSWT        64-65
NGTTHRU     66-67      TRAINS        61-63
DAYSWT      68-69      DAYTHRU       70-71
MXTTSP      72-74      MTRKS         75-75
OTRKS       76-77      PASS_TRN     $ 78-78
PAVED       $ 79-79      TRAFLN        80-80
FC10        81-81      FC1           82-82
AADT        83-88      PCTTRUK     $ 89-90
CHANGE_D    91-92
ACC0        93-94      ACC1           95-96
ACC2        97-98      ACC3           99-100
ACC4       101-102     ACC5          103-104;
```

\* The parameters ACC0 thru ACC5 are taken from accident history file. If the change year of the warning device is within the period of six years, the accidents prior to warning device change are set to zero.

All other parameters are taken from the Rail Highway Crossing Inventory file.

LIST OF PARAMETERS USED IN NEWDAT PROCEDURE

VARIABLE	VARIABLE DESCRIPTION
CROSSING	CROSSING ID NUMBER
INTID	INTEGER VALUE OF CROSSING ID
STATE	LOCATION STATE CODE
CONTY	LOCATION COUNTY CODE
CITY	LOCATION CITY CODE
RAILROAD	RAILROAD CODE
CHANGE_Y	YEAR OF LAST WARNING DEVICE CHANGE
CHANGE_M	MONTH OF LAST WARNING DEVICE CHANGE
ROAD	ROAD OR STREET NAME
RRID	RAILROAD DESIGNATION
MILEPOST	MILEPOST AT CROSSING
OLDCL	OLD CLASSIFICATION OF THE CROSSING
NEWCL	NEW CLASSIFICATION OF THE CROSSING
STOP	STOP SIGNS
TRAINS	NUMBER OF TOTAL TRAINS
NGTSWT	NUMBER OF NIGHT SWITCH TRAINS
NGTTHRU	NUMBER OF NIGHT THRU TRAINS
DAYSWT	NUMBER OF DAY SWITCH TRAINS
DAYTHRU	NUMBER OF DAY THRU TRAINS
MXTTSP	MAXIMUM TIME TABLE SPEED
MTRKS	MAIN TRACKS
OTRKS	OTHER TRACKS
PASS_TRN	NUMBER OF PASSANGER TRAINS
PAVED	IS HIGHWAY PAYED ?
TRAFLN	TRAFFIC LANES
FC10	TENS DIGIT OF FUNCTIONAL CLASSIFICATION
FC1	UNITS DIGIT OF FUNCTIONAL CLASSIFICATION
AADT	ANNUAL AVERAGE DAILY TRAFFIC
PCTTRUK	PERCENTAGE TRUCKS
CHANGE_D	DAY OF LAST WARNING DEVICE CHANGE
ACC0, ACC1	"SIX FIELDS OF NUMBER OF ACCIDENTS
ACC2, ACC3	IN LAST SIX YEARS. EACH FIELD HAS
ACC4, ACC5	TWO POSITIONS. THE MOST RECENT YEAR
	IS ACC5."

## APPENDIX B

This Appendix contains a listing of the program RESAL.NEW, written in the SAS language, version 82.4, which is used to calculate resource allocation results.

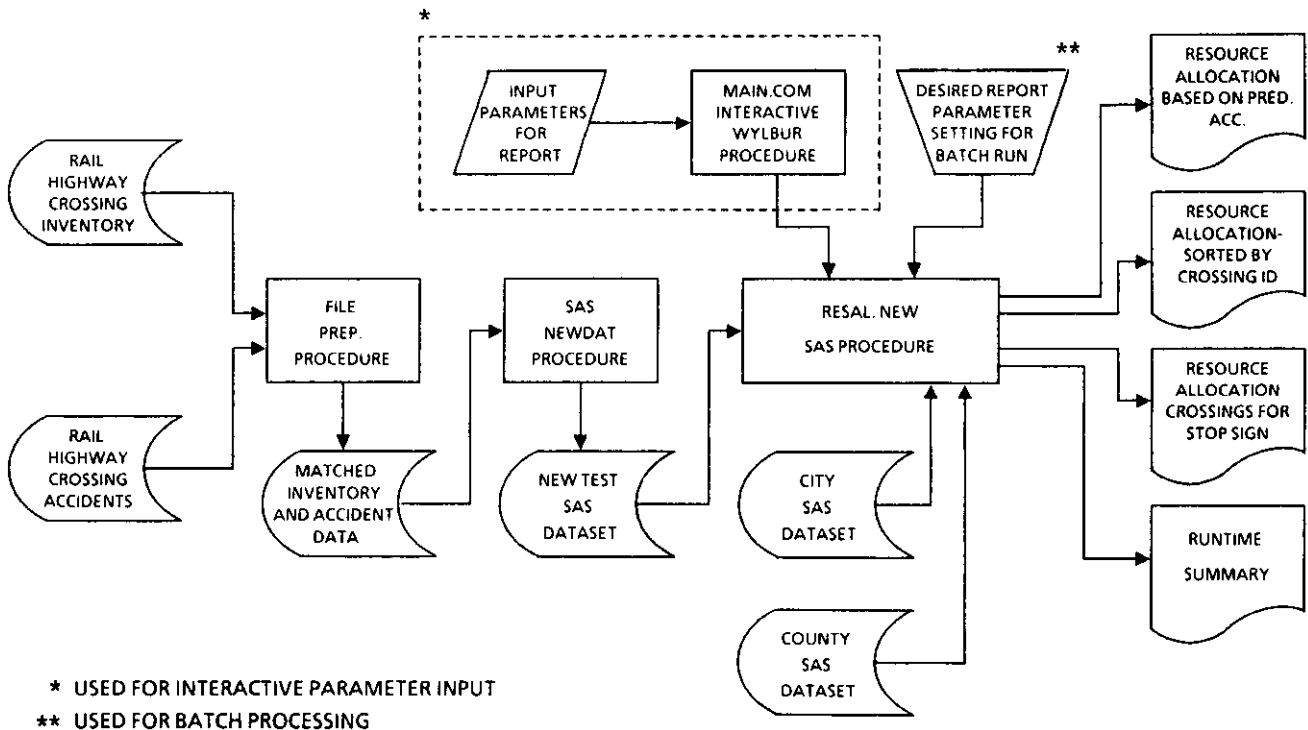


FIGURE B-1. DATA FLOW FOR RESOURCE ALLOCATION

NOTE: THE SAS PROCEDURE NEWDAT IS GIVEN IN APPENDIX A2.

APPENDIX B1

LISTING OF PROGRAM RESAL.NEW

```

//
//JOB CARD
//
//PROCLIB DD DSN=ZABCRUN.PROCLIB,DISP=SHR
//A EXEC SAS,REGION=900K
//DD1 DD SYSOUT=A
//FINALL DD DSN=WTPIFZU.NEWTEST,DISP=(OLD,KEEP),UNIT=FILE,
// VOL=SER=FRASIR
//FILEB DD DSN=WTPIFZU.CITY,DISP=(OLD,KEEP),UNIT=FILE,
// VOL=SER=FRASIR
//FILEC DD DSN=WTPIFZU.COUNTY,DISP=(OLD,KEEP),UNIT=FILE,
// VOL=SER=FRASIR
//SYSIN DD *
DATA TRIM;
SET FINALL.NEWTEST;
*****
* THIS PROGRAM IS CALLED BY THE MAIN.COM PROCEDURE
* TO GENERATE REPORT FOR RESOURCE ALOCATION. HOWEVER
* BY SPECIFYING THE VALUES OF FOLLOWING VARIABLES, IT
* CAN BE RUN INDEPENDENTLY IN BATCH MODE.

SATEVAL          = TWO DIGIT STATE CODE
COUNTVAL        = THREE DIGIT COUNTY CODE
CITYVAL          = FOUR DIGIT CODE FOR CITY
RAILVAL          = FOUR CHARACTER CODE FOR RAILROAD
ID1VAL           = SIX DIGIT NUMERIC CODE FOR THE FIRST
                  CROSSING ID
ID2VAL           = SIX DIGIT NUMERIC CODE FOR THE FINAL
                  CROSSING ID
SELVAL           = 1 -FOR ACCIDENT PREDICTION
                  2 -FOR RESOURCE ALLOCATION
ACCVAL           = 1 -PREDICTED ACCIDENTS
                  2 -FATAL ACCIDENTS
                  3 -COMBINED CASUALTY INDEX
OPTVAL           = 1 -STANDARD EFFECTIVENESS
                  2 -EXTENDED EFFECTIVENESS
C1 - C3          = THREE VALUES OF UPGRADE COSTS
S1 - S3          = THREE VALUES OF STANDARD EFFECTIVENESS
X1 - X12         = TWELVE VALUES OF EXTENDED EFFECTIVENESS
KK               = FATALITY FACTOR
BUDGETX          = AVAILABLE BUDGET IN DOLLARS
TITVAL           = A CHARACTER STRING OF THE TITLE TO BE PRINTED
                  AT THE TOP OF EACH PAGE IN THE REPORT

```

IF ANY OF THE VARIABLE DOES NOT HAVE ANY SPECIFIC VALUE  
IT IS ASSIGNED A MISSING VALUE OF PERIOD (.)

\*\*\*\*\*;

50  
51  
52

199  
8978  
8013  
8911

```

MACRO CROSSBK .8644 %;
MACRO FLASHLK .8887 %;
MACRO GATESK .8131 %;
ISTATE= STATEVAL;
ICOUNTY= COUNTVAL;
ICITY= CITYVAL;
IRAIL= 'RAILVAL';
ID1= ID1VAL;
ID2= ID2VAL;
IF ISTATE NE . THEN DO ;
IF STATE NE ISTATE THEN DELETE;           END;
IF ICOUNTY NE . THEN DO;
IF CONTY NE ICOUNTY THEN DELETE;         END;
IF ICITY NE . THEN DO;
IF CITY NE ICITY THEN DELETE;           END;
IF IRAIL NE '.' THEN DO;
IF (RAILROAD NE IRAIL ) THEN DELETE;     END;
IF (ID1 > 0 ) THEN DO;
IF INTID < ID1 THEN DELETE;             END;
IF (ID2 > 0 ) THEN DO;
IF INTID > ID2 THEN DELETE;             END;

```

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```

CLASS=NEWCL;
IF CHANGE_Y > 80 THEN CLASS= OLDCL;
IF OLDCL > 8 THEN CLASS = NEWCL;
*****;
*   DELETE ALL RECORDS FOR GATES IF RESOUC E ALLOCATION
*   IS TO BE PERFORMED AND GET THE TOTAL NUMBER OF
*   CROSSINGS BEING ANALYZED.
*****;
SELECT= SELVAL;
IF (SELECT = 2 AND NEWCL = 8 ) THEN DELETE;
TRACKS=MTRKS+OTRKS;
DROP ISTATE ICOUNTY ICITY IRAIL ID1 ID2 INTID ;
PROC MEANS NOPRINT;
OUTPUT OUT=TOTREC N= NUM_CRO;
*****
*
*   COMPUTE H VALUE FOR DIFFERENT CLASS TYPE
*
*****;
*****
*
*   CALCULATION FOR PASSIVE
*
*****;
DATA ICROSS;
SET TRIM;
*
*   DELETE ALL NON PASSIVE CROSSINGS;
*
IF (CLASS > 4) THEN DELETE;
H= .0006938*((AADT*TRAINS +0.2)/.2)**.37)*

```

```

                (((DAYTHRU + 0.2)/0.2)**0.178)*
                (EXP (0.0077*MXTTSP))*
                (EXP (-0.5966*(PAVED-1)));
*****
*
*   FLASHING LIGHTS CALCULATION
*
*****;
DATA IFLASH;
SET TRIM;
IF (CLASS < 5 OR CLASS > 7 ) THEN DELETE;
H= .0003351*(((AADT*TRAINS + 0.2)/0.2)** 0.4106)*
    (((DAYTHRU +0.2)/0.2)**0.1131)*
    (EXP (0.1917*MTRKS))*
    (EXP (0.1826*(TRAFLN - 1))) ;
*****;
*
*   MERGING OF TWO SETS BY CROSSINGS AND USING EFFECTIVENESS
*
*****;
DATA XING;
SET IFLASH ICROSS;
BY CROSSING;
ARRAY UP UP1-UP3;
ARRAY DN DN1-DN3;
ARRAY UPDN(K) UP1-UP3 DN1-DN3;
OPTION= OPTVAL;
IF OPTION NE 1 THEN DO;
*   ---*   USE EXTENDED EFFECTIVENESS VALUS   *---           ;
IF TRACKS > 1 AND TRAINS > 10 THEN DO;
UP1= 1-X10;   UP2= 1-X11;   UP3= 1-X12; END;
ELSE IF TRACKS > 1 AND TRAINS < 11 THEN DO;
UP1= 1-X7;    UP2= 1-X8;    UP3= 1-X9;  END;
ELSE IF TRACKS=1 AND TRAINS > 10 THEN DO;
UP1= 1-X4;    UP2= 1-X5;    UP3= 1-X6;  END;
ELSE IF TRACKS=1 AND TRAINS LT 11 THEN DO;
UP1= 1-X1;    UP2= 1-X2;    UP3= 1-X3;  END;
END;
ELSE DO;
*   ---*   USE STANDARD EFFECTIVENESS VALUES   *---           ;
UP1= 1-S1;    UP2= 1-S2;    UP3= 1-S3;  END;
DO OVER UP;
DN = 1/UP;
END;
*
*   ---*   GENERATE INDEX VALUE TO BE USED WITH ARRAY   *---
*   ---*   OF EFFECTIVENESS VALUES                     *---
*
IF CLASS = NEWCL THEN GO TO LAB1;
IF (OLDCL LT NEWCL) THEN DO;
    K=2;
    IF(NEWCL NE 8) THEN K= 1;
    IF(OLDCL GT 4) THEN K= 3;
END;

```

IF (OLDCL GT NEWCL) THEN DO;

K=5;

IF (OLDCL NE 8) THEN K=4;

IF (NEWCL > 4) THEN K=6;

END;

H=H\*UPDN;

\*\*\*\*\*

\*

\* CALCULATIONS FOR PREDICTED ACCIDENTS

\*

\*\*\*\*\*;

LAB1:

CURYEAR= 85;

TA= CURYEAR-CHANGE\_Y;

IF TA < 0 THEN TA= 0;

IF TA > 5 THEN TA = 5;

NACC= ACC1+ACC2+ACC3+ACC4+ACC5;

T0=1./(.05+H);

A=(H\*T0 + NACC)/(TA + T0);

IF CLASS LE 4 THEN A= CROSSBK\*A;

ELSE IF (4 < CLASS < 8) THEN A= FLASHLK\*A;

ELSE A= GATESK\*A;

DROP NACC TA T0 UP1-UP3 DN1-DN3 K TRAINS ;

\*\*\*\*\*

\*

\* CALCULATIONS FOR FATAL ACCIDENTS

\*

\*\*\*\*\*;

ACCD= ACCVAL;

IF ACCD > 1 THEN DO;

THRU=DAYTHRU+NGTTHRU;

SWITCH=DAYSWT+NGTSWT;

MS= MXTTSP\*\*(-.9981);

TT= (1+THRU)\*\*(-0.0872);

TS= (1+SWITCH)\*\*0.0872;

UR= EXP(0.3571\*FC10);

FATPRB=1/(1. + (440.9\*MS\*TT\*TS\*UR));

FATAL=FATPRB\*A;

DROP MS TT TS FATPRB;

\*\*\*\*\*

\*

\* CALCULATIONS FOR CASUALTY ACCIDENTS

\*

\*\*\*\*\*;

IF ACCD = 3 THEN DO;

MS=MXTTSP\*\*(-0.343);

TRK=0.1153\*TRACKS;

TK=EXP(TRK);

URB=0.2960\*FC10;

UR=EXP(URB);

CASPRB=1.0/(1+(4.481\*MS\*TK\*UR));

CAS= CASPRB\*A;

COMCAS= (KK- 1)\*FATAL+ CAS;

DROP TRK TK UR CASPRB CAS;



```

END;    END;
IF ACCD= 1 THEN ACCIDENT= A;
ELSE IF ACCD= 2 THEN ACCIDENT = FATAL;
ELSE ACCIDENT= COMCAS;
DROP A COMCAS FATAL;
*****;
*
*   RESOURCE ALLOCATION PROGRAM BEGINS
*
*****;
DATA RES;
SET XING;
CLASS= NEWCL;
*   ---* DELETE CROSSINGS DOWNGRADED IN LAST FIVE YEARS *--- ;
IF CLASS > 7 THEN DELETE;
EFFLAG = OPTVAL; *1- STANDARD EFFECTIVENESS  2- EXTENDED EFFECT.;
COST1= CS1;    COST2= CS2;    COST3= CS3;
TRAINS=NGTSWT +DAYSWT + DAYTHRU +NGTTHRU;
TRACKS = MTRKS +OTRKS;
*****
* IDENTIFY THE CROSSINGS WHICH QUALIFY FOR THE STOP SIGNS
*****;
STPFLG = 0;
IF (STOP > 0 OR CLASS > 4 OR FC1 NE 9 OR TRAINS < 10 OR
    TRACKS NE 1) THEN GO TO LAB3;
IF ((FC10 NE 1 AND AADT < 400) OR
    (FC10 EQ 1 AND AADT < 1500)) THEN STPFLG = 1;
*****
* SELECT EFFECTIVENESS VALUES
*****;
LAB3:
    IF EFFLAG = 1 THEN DO;
        EF1= S1;    EF2= S2;    EF3= S3;
        GO TO LAB4;
    END;
IF TRACKS > 1 AND TRAINS > 10 THEN DO;
    EF1= X10;  EF2= X11;  EF3= X12; END;
IF TRACKS > 1 AND TRAINS < 11 THEN DO;
    EF1= X7;   EF2= X8;   EF3= X9;  END;
IF TRACKS = 1 AND TRAINS > 10 THEN DO;
    EF1= X4;   EF2= X5;   EF3= X6;  END;
IF TRACKS = 1 AND TRAINS < 11 THEN DO;
    EF1= X1;   EF2= X2;   EF3= X3;  END;
*****
* COMPUTE BENEFIT RATIOS ACCIDENT AND COST BENEFITS
*****;
LAB4:
RAT1 = EF1/COST1;
RAT2 = EF2/COST2;
RAT3 = EF3/COST3;
*
IF NEWCL < 5 AND TRACKS > 1 THEN DO;
    RAT= RAT2;    COST= COST2;  EFFECT= EF2; RECCAT= 'GATE '; END;
ELSE IF NEWCL > 4 THEN DO
    ;

```

```

    RAT= RAT3;    COST= COST3;  EFFECT= EF3; RECCAT= 'GATE '; END;
ELSE
    DO;
    RAT= RAT1;    COST= COST1;  EFFECT= EF1; RECCAT= 'FLASH'; END;
*
BENCOS= ACCIDENT*RAT*10.**6;
ACCBEN= ACCIDENT*EFFECT;
*
KEEP BENCOS ACCBEN ACCIDENT ACCD RECCAT CROSSING NEWCL TRAINS
TRACKS FC10 FC1 AADT COST1 COST2 COST3 EF1 EF2 EF3 STPFLG
COST EFFECT STATE CONTY CITY RAILROAD ROAD RRID MILEPOST;

DATA INCREM;
SET RES;
* ---* CALCULATE INCREMENTAL BENEFIT AND COST VALUES *--- ;
IF NEWCL > 4 OR TRACKS > 1 THEN DELETE;
BENCOS= ACCIDENT*(EF2-EF1)/(COST2- COST1)*10**6;
RECCAT= 'S      ';
ACCBEN= (EF2- EF1)*ACCIDENT;
COST= COST2- COST1;

DATA CONC;
*****
* APPEND THE CROSSINGS WITH INCREMENTAL BENEFIT TO THE
* THE CROSSINGS SELECTED EARLIER AND SORT THEM BY
* ACCIDENT COST BENEFIT VALUES.
*****;

SET RES INCREM;
PROC SORT;
BY DESCENDING BENCOS;

DATA CUMCOST;
SET CONC;
* ---* CALCULATE TOTAL COST AND LIMIT THE NUMBER OF *---
* ---* CROSSINGS WHICH CAN BE COVERED WITHIN BUDGET *--- ;
BCOST= BUDGETX ;
RETAIN TCOST 0;
TCOST= TCOST+ COST;
IF TCOST > BCOST THEN STOP;
DATA;
SET _LAST_ ;
PROC MEANS NOPRINT;
VAR BENCOS;
OUTPUT OUT=OUTMIN MIN=MINBEN;

DATA CUMCOST1 INCL;
SET CUMCOST;
DROP BCOST TCOST;
IF RECCAT = 'S      ' THEN OUTPUT INCL;
ELSE OUTPUT CUMCOST1;
PROC SORT DATA=CUMCOST1;
BY CROSSING;
DATA INC2;
SET INCL;

```

```

RENAME BENCOS=IBEN RECCAT=IREC ACCBEN=IABEN COST=ICOST;
KEEP CROSSING BENCOS RECCAT ACCBEN COST;
PROC SORT;
BY CROSSING;

DATA REP1;
MERGE CUMCOST1(IN=A) INC2;
BY CROSSING;
IF A;
PROC SORT;
BY DESCENDING BENCOS;
DATA REP2;
* ---* COMPUTE DECISION CRITERIA VALUES *--- ;
MERGE REP1 OUTMIN;
RETAIN MINTBEN 0;
IF MINBEN = . THEN MINBEN= 0;
MINTBEN= MINTBEN+ MINBEN;
IF EFFECT = EF1 THEN
DC2=MINTBEN/(ACCIDENT*(EF2-EF1)/(COST2-COST1)*10.**6);
IF IREC= 'S ' THEN DO;
DC1=MINTBEN/BENCOS;
  BENCOS=ACCIDENT*EF2/COST2*10**6;
  ACCBEN=ACCBEN+IABEN;
  COST =COST + ICOST;
  RECCAT= 'GATE ';
END;
KEEP CROSSING ACCBEN BENCOS RECCAT NEWCL TRACKS TRAINS DC2
  DC1 ACCIDENT COST MINTBEN EFFECT EF1 EF2 EF3 STPFLG
STATE AADT FC10 ACCD CONTY CITY RAILROAD ROAD RRID MILEPOST;
PROC FORMAT;
VALUE CLASS 1-4='PASS '
           5-7='FLASH';
VALUE YES_NO 0=NO
           1=YES;
VALUE URBR 0=RURAL
           1=URBAN;
PICTURE ACCBNF OTHER='9.999999';
PICTURE DECIS OTHER='9.999';

DATA DATA1A;
* ---* ADD STATE, CITY AND COUNTY DESCRIPTION TO EACH *---
* ---* RECORD IN THE SELECTED SET *--- ;
SET REP2;
RENAME CONTY=COUNTY_C CITY=CITY_C;
PROC SORT;
BY STATE COUNTY_C ;
DATA DATA1B;
MERGE DATA1A(IN=A) FILEC.COUNTY ;
BY STATE COUNTY_C ;
IF A;
PROC SORT;
BY STATE CITY_C;
DATA DATA1C;
MERGE DATA1B(IN=A) FILEB.CITY;

```

```

BY STATE CITY_C;
IF A;
DSTATE= 0;
DSTATE= STATE;
PROC FORMAT;
VALUE ESTATE 1='AL' 2='AK' 3=' ' 4='AZ'
              5='AR' 6='CA' 7=' ' 8='CO'
              9='CT' 10='DE' 11='DC' 12='FL'
              13='GA' 14=' ' 15='HI' 16='ID'
              17='IL' 18='IN' 19='IA' 20='KS'
              21='KY' 22='LA' 23='ME' 24='MD'
              25='MA' 26='MI' 27='MN' 28='MS'
              29='MO' 30='MT' 31='NE' 32='NV'
              33='NH' 34='NJ' 35='NM' 36='NY'
              37='NC' 38='ND' 39='OH' 40='OK'
              41='OR' 42='PA' 43='PR' 44='RI'
              45='SC' 46='SD' 47='TN' 48='TX'
              49='UT' 50='VT' 51='VA' 52='VI'
              53='WA' 54='WV' 55='WI' 56='WY';

```

```

PICTURE PREDACC OTHER='9.999999';
DATA FINAL1;
SET DATA1C;
PROC SORT;
BY DESCENDING BENCOS;
DATA FINAL;
SET FINAL1;
RETAIN CUMCOST CUMARED 0;
CUMCOST=CUMCOST + COST;
CUMARED=CUMARED+ACCBEN;
IF EFFECT = EF1 AND DC1=. THEN DC1=MINTBEN/BENCOS;
ELSE IF EFFECT = EF2 THEN DC3=MINTBEN/BENCOS;
ELSE IF EFFECT= EF3 THEN DC4= MINTBEN/BENCOS;
MACRO LAB0 CROSSING=XING*ID*# BENCOS=BEN/COST*RATIO
RECCAT=RECOMMD*WARNING*DEVICE
NEWCL=PRESENT*WARNING*DEVICE
TRACKS=TOTAL*TRACKS TRAINS=TOTAL*TRAINS*PER" "DAY
CUMCOST=CUMULATIVE*COST
CUMARED=CUMULATIVE*REDUCED*ACCIDENTS
STPFLG=STOP*SIGN*REQMNT
FC10=CROSSING*LOCATION*URBAN/RURAL % ;
MACRO LABB ACCIDENT=PREDICTED*ACCIDENTS*PER' 'YEAR %;
MACRO LABF ACCIDENT=PREDICTED*FATAL' 'ACC*PER' 'YEAR %;
MACRO LABC ACCIDENT=PREDICTED*CCI*INDEX %;
MACRO LABP CROSSING=CROSSING*ID BENCOS=BEN/COST*RATIO
DSTATE= STATE COT_NAME=COUNTY CTY_NAME=CITY %;

```

```

DATA BASIC;
*****
* PRINT REPORT FOR SEVERITY MEASURE = PREDICTED ACCIDENTS
*****;

```

```

LABEL LAB0 LABB;
SET FINAL;
IF ACCD NE 1 THEN STOP;

```

```

PROC PRINT SPLIT=*;
VAR CROSSING ACCIDENT BENCOS RECCAT NEWCL TRACKS TRAINS CUMCOST
CUMARED DC1 DC2 DC3 DC4 STPFLG;
FORMAT NEWCL CLASS. STPFLG YES_NO.
      ACCIDENT CUMARED ACCBNF.
      DC1 DC2 DC3 DC4 DECIS.;
TITLE TITVAL;
TITLE2 RAIL-HIGHWAY CROSSING RESOURCE ALLOCATION RESULTS;
TITLE3 BASED ON PREDICTED ACCIDENTS PER YEAR;

DATA;
* ---* PRINT REPORT SORTED BY CROSSING ID      *---      ;
LABEL LAB0 LABB LABP;
SET BASIC;
PROC SORT;
BY CROSSING;
PROC PRINT SPLIT=*;
VAR CROSSING BENCOS DSTATE COT_NAME CTY_NAME RAILROAD ROAD RRID
MILEPOST;
FORMAT DSTATE ESTATE. ACCIDENT PREDACC.;
TITLE1 TITVAL;
TITLE2 PUBLIC RAIL-HIGHWAY CROSSINGS RESOURCE ALLOCATION RESULTS;
TITLE3 BASED ON PREDICTED ACCIDENTS PER YEAR (SORTED BY CROSSING IDs);

DATA;
* ---* PRINT REPORT FOR CROSSINGS ELIGIBLE FOR STOP SIGNS *--- ;
LABEL LAB0 LABB ;
SET BASIC;
IF STPFLG = 0 THEN DELETE;
PROC PRINT SPLIT= *;
VAR CROSSING ACCIDENT NEWCL TRAINS AADT FC10;
FORMAT FC10 URBR.;
TITLE1 TITVAL;
TITLE2 RAIL-HIGHWAY CROSSING RESOURCE ALLOCATION RESULTS;
TITLE3 POSSIBLE CANDIDATE CROSSINGS FOR STANDARD HIGHWAY STOP SIGNS;
TITLE4 (SEE NOTE AT THE END OF SUMMARY PAGE);

DATA FATAL;
*****
* PRINT REPORT FOR SEVERITY MEASURE = FATAL ACCIDENTS
*****;
LABEL LAB0 LABF;
SET FINAL;
IF ACCD NE 2 THEN STOP;
PROC PRINT SPLIT=*;
VAR CROSSING ACCIDENT BENCOS RECCAT NEWCL TRACKS TRAINS CUMCOST
CUMARED DC1 DC2 DC3 DC4 STPFLG;
FORMAT NEWCL CLASS. STPFLG YES_NO.
      ACCIDENT CUMARED ACCBNF.
      DC1 DC2 DC3 DC4 DECIS.;
TITLE TITVAL;
TITLE2 RAIL-HIGHWAY CROSSING RESOURCE ALLOCATION RESULTS;
TITLE3 BASED ON PREDICTED FATAL ACCIDENTS PER YEAR;

```

```

DATA;
LABEL LABO LABB LABP;
* ---* PRINT REPORT SORTED BY CROSSING IDS          *--- ;
SET FATAL;
PROC SORT;
BY CROSSING;
PROC PRINT SPLIT=*;
VAR CROSSING BENCOS DSTATE COT_NAME CTY_NAME RAILROAD ROAD RRID
MILEPOST;
FORMAT DSTATE ESTATE. ACCIDENT PREDACC.;
TITLE1 TITVAL;
TITLE2 PUBLIC RAIL-HIGHWAY CROSSINGS RESOURCE ALLOCATION RESULTS;
TITLE3 BASED ON PREDICTED FATAL ACCIDENTS PER YEAR (SORTED BY CROSSING
IDS);
DATA;
* ---* PRINT REPORT FOR CROSSINGS ELIGIBLE FOR STOP SIGNS *--- ;
LABEL LABO LABF;
SET FATAL;
IF STPFLG = 0 THEN DELETE;
PROC PRINT SPLIT=*;
VAR CROSSING ACCIDENT NEWCL TRAINS AADT FC10;
FORMAT FC10 URBR.;
TITLE1 TITVAL;
TITLE2 RAIL-HIGHWAY CROSSING RESOURCE ALLOCATION RESULTS;
TITLE3 POSSIBLE CANDIDATE CROSSINGS FOR STANDARD HIGHWAY STOP SIGNS;
TITLE4 (SEE NOTE AT THE END OF SUMMARY PAGE);
DATA CCI;
*****
* PRINT REPORT FOR SEVERITY MEASURE= COMBINED CASUALTY INDEX
*****;
LABEL LABO LABC;
SET FINAL;
IF ACCD NE 3 THEN STOP;
PROC PRINT SPLIT=*;
VAR CROSSING ACCIDENT BENCOS RECCAT NEWCL TRACKS TRAINS CUMCOST
CUMARED DC1 DC2 DC3 DC4 STPFLG;
FORMAT NEWCL CLASS. STPFLG YES_NO.
ACCIDENT CUMARED ACCBNF.
DC1 DC2 DC3 DC4 DECIS.;
TITLE TITVAL;
TITLE2 RAIL-HIGHWAY CROSSING RESOURCE ALLOCATION RESULTS;
TITLE3 BASED ON COMBINED CASUALTY INDEX (CCI);

DATA;
* ---* PRINT THE REPORT SORTED BY CROSSING IDS          *--- ;
LABEL LABO LABC LABP;
SET CCI;
PROC SORT;
BY CROSSING;
PROC PRINT SPLIT=*;
VAR CROSSING BENCOS DSTATE COT_NAME CTY_NAME RAILROAD ROAD RRID
MILEPOST;
FORMAT DSTATE ESTATE. ACCIDENT PREDACC.;
TITLE1 TITVAL;

```

```

TITLE2 PUBLIC RAIL-HIGHWAY CROSSINGS RESOURCE ALLOCATION RESULTS;
TITLE3 BASED ON PREDICTED COMBINED CASUALTY INDEX (SORTED BY CROSSING
IDs);
DATA;
* ---* PRINT REPORT FOR CROSSINGS ELIGIBLE FOR STOP SIGNS *--- ;
LABEL LABO LABC;
SET CCI;
IF STPFLG = 0 THEN DELETE;
PROC PRINT SPLIT= *;
VAR CROSSING ACCIDENT NEWCL TRAINS AADT FC10;
FORMAT FC10 URBR.;
TITLE1 TITVAL;
TITLE2 RAIL-HIGHWAY CROSSING RESOURCE ALLOCATION RESULTS;
TITLE3 POSSIBLE CANDIDATE CROSSINGS FOR STANDARD HIGHWAY STOP SIGNS;
TITLE4 (SEE NOTE AT THE END OF SUMMARY PAGE);

DATA SUMMRY;
* ---* PRINT SUMMARY FOR INPUT PARAMETERS AND THE RUN *--- ;
SET TOTREC;
FILE DD1, PRINT;
ACCD= ACCVAL;
OPTION= OPTVAL;
Y1= X1; Y2= X2; Y3= X3; Y4= X4; Y5= X5; Y6= X6;
Y7= X7; Y8=X8; Y9=X9; A1= X11; A2= X12; A0= X10;
ID1= ID1VAL; ID2= ID2VAL;
IF ID1= 0 THEN DO;
ID1= .; ID2= .; END;
COST1= CS1; COST2= CS2; COST3= CS3; BCOST= BUDGETX;
PUT ///@36'*****' ;
*';
PUT @36 '* SUMMARY OF INPUT PARAMETERS
*';
PUT @36 '* FOR RESOURCE ALLOCATION PROCEDURE
*';
PUT @36
'*****';
PUT /@36 ' TITLE : TITVAL ';
PUT @36 ' STATE : STATEVAL ';
PUT @36 ' COUNTY : COUNTVAL ';
PUT @36 ' CITY : CITYVAL ';
PUT @36 ' RAILROAD : RAILVAL ';
PUT @36 ' CROSSING ID :
PUT @36 ' -BOTTOM OF RANGE : ' ID1;
PUT @36 ' -TOP OF RANGE : ' ID2;
PUT @36 ' SEVERITY TYPE : ACCVAL (1) PREDICTED
ACCIDENTS';
PUT @36 ' : (2) FATAL ACCIDENT';
PUT @36 ' : (3) COMBIN. CASUALTY INDEX';
IF ACCD = 3 THEN
PUT @36 ' FATALITY FACTOR : KK ';
PUT @36 ' EFFECTIVENESS : ' OPTION ' (1) STANDARD ';
PUT @36 ' CHOICE : (2) EXTENDED ';
PUT @36 ' : ' ;
IF OPTION = 1 THEN DO;

```

```

PUT @36 ' STANDARD EFF. VALUES : S1 S2 S3';
END;
ELSE DO;
PUT @36 ' EXTENDED EFF. VALUES : ';
PUT @36 ' '
PUT @36 ' TRAINS <=10 TRAINS >=11
PUT @36 ' SINGLE MULTI SINGLE
MULTI';
PUT @36 ' TRACK TRACK TRACK
TRACK';
PUT @36 ' '
PUT @36 ' PASSIVE TO FLASHING : ' Y1 @74 Y7 @84 Y4 @95 A0;
PUT @36 ' PASSIVE TO GATES : ' Y2 @74 Y8 @84 Y5 @95 A1;
PUT @36 ' FLASHING TO GATES : ' Y3 @74 Y9 @84 Y6 @95 A2;
END;
PUT @36 ' : ' ;
PUT @36 ' UPGRADE COSTS- : ' ;
PUT @36 ' PASSIVE TO FLASHING : ' COST1 DOLLAR11.2;
PUT @36 ' PASSIVE TO GATES : ' COST2 DOLLAR11.2;
PUT @36 ' FLASHING TO GATES : ' COST3 DOLLAR11.2;
PUT @36 ' : ' ;
PUT @36 ' AVAILABLE BUDGET : ' BCOST DOLLAR15.2;
PUT
//@36'*****';
PUT /@36 ' TOTAL NUMBER OF CROSSINGS ANALYZED : '
NUM_CRO;
PUT /@36 ' ALL CANDIDATE CROSSINGS FOR STANDARD HIGHWAY STOP SIGNS
PUT @36 ' ARE SINGLE TRACK, LOCAL CROSSINGS. REFER TO PARAGRAPH
PUT @36 ' 8B-9 OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES
PUT @36 ' FOR FACTORS TO BE CONSIDERED PRIOR TO MAKING STOP
PUT @36 ' SIGN INSTALLATION DECISIONS.';
PUT /@36 ' INVENTORY DATE: APRIL 1986';
PUT
//@36'*****';
TITLE1 TITVAL;

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