```
      PARAMETER (NL=30,NQ=101)
      COMMON/SLA/P(NQ),IE(NQ,1),EO(NL),DX,NBX,NEL,PII,NOUT
      DIMENSION PP(NQ),G(NL),WC(NL)
      CHARACTER *64 TITLE

      OPEN(5,FILE='VDIN.DAT')
      OPEN(6,FILE='VDOU.DAT')
      READ(5,'(A)')     TITLE
      WRITE(6,'(1X,A)') TITLE

      GAW=0.03125
      PII=3.14159265
      NP=1

      READ(5,*) NPROB,NOPT,NBPRES,NNP,NBX,NMAT,DX
      WRITE(6,3) NPROB,NNP,NBX,NMAT,DX

      IF(NOPT.EQ.0)WRITE(6,'(10X,A,/)') 'CONSOLIDATION SWELL MODEL'
      IF(NOPT.EQ.2)WRITE(6,'(10X,A,/)')   'SCHMERTMANN MODEL'
      IF(NOPT.EQ.4)WRITE(6,'(10X,A,/)')   'ELASTIC SOIL'

      IF(NBPRES.EQ.1)  THEN
         WRITE(6,'(10X,A,/)') 'RECTANGULAR SLAB FOUNDATION'
      ELSE
         WRITE(6,'(10X,A,/)') 'LONG CONTINUOUS STRIP FOUNDATION'
      ENDIF

      DEPF=DX*FLOAT(NBX-1)
      WRITE(6,11)DEPF
      DEPPR = DX*FLOAT(NNP-1)
      WRITE(6,12)DEPPR
      NEL=NNP-1
      L=0
      WRITE(6,21)
   22 READ(5,*)N,IE(N,1)
   25 L=L+1
      IF(N-L)35,35,30
   30 IE(L,1)=IE(L-1,1)
      WRITE(6,32)L,IE(L,1)
      GOTO 25
   35 WRITE(6,32)L,IE(L,1)
      IF(NEL-L)40,40,22
   40 CONTINUE
      WRITE(6,390)
  400 READ(5,*) M,G(M),WC(M),EO(M)
  401 FORMAT(I5,3F10.3)
      IF(NMAT-M)403,405,400
  403 WRITE(6,404) M

  405 DO M=1,NMAT
        WRITE(6,407) M,G(M),WC(M),EO(M)
      ENDDO

 1000 READ(5,*) DGWT,IOPTION,NOUT
```

```
      READ(5,*)Q,BLEN,BWID,MRECT
      WRITE(6,50) DGWT

      IF(NOUT.EQ.1) WRITE(6,51)
      IF(NOUT.EQ.0) WRITE(6,52)
      IF(IOPTION.EQ.0.OR.NOPT.EQ.1) WRITE(6,61)
      IF(IOPTION.EQ.1.AND.NOPT.EQ.0)WRITE(6,62)

      WRITE(6,90)Q,BLEN,BWID
      IF(MRECT.EQ.0) THEN
        WRITE(6,'(9X,A,/)')'CENTER OF FOUNDATION'
      ELSE
       WRITE(6,'(9X,A,/)')'CORNER OF SLAB OR EDGE OF LONG STRIP FOOTING'
      ENDIF

C     CALCULATION OF EFFECTIVE OVERBURDEN PRESSURE

  105 P(1)=0.0
      PP(1)=0.0
      DXX=DX
      DO I=2,NNP
        MTYP=IE(I-1,1)
        WCC=WC(MTYP)/100.
        GAMM=G(MTYP)*GAW*(1.+WCC)/(1.+EO(MTYP))
        IF(DXX.GT.DGWT)GAMM=GAMM-GAW
        P(I)=P(I-1)+DX*GAMM
        PP(I)=P(I)
        DXX=DXX+DX
      ENDDO

      IF(NOPT.NE.0.OR.IOPTION.EQ.0)GOTO 120
      MO=IFIX(DGWT/DX)
      IF(MO.GT.NNP)MO=NNP

      DO I=1,MO
        BN=DGWT/DX-FLOAT(I-1)
        P(I)=P(I)+BN*DX*GAW
      ENDDO

  120 CALL SLAB(Q,BLEN,BWID,MRECT,NBPRES,PP(NBX))

C     CALCULATION OF MOVEMENT FROM MODELS

      IF(NOPT.EQ.0) CALL MECH(NMAT)
      IF(NOPT.EQ.2) CALL SCHMERT(Q,NMAT,DGWT,BWID,PP,NBPRES,2)
      IF(NOPT.EQ.4) CALL SCHMERT(Q,NMAT,DGWT,BWID,PP,NBPRES,4)
```

NOTE:

1. LEON and COLL options are removed
2. SUBROUTINE SPLINE, SOLVE and BICUBE, as well as BLOCK DATA, are not required

```
      NP=NP+1

      IF(NP.GT.NPROB) GOTO 200
```

```
      GOTO 1000
  200 CLOSE(5)
      CLOSE(6)
      STOP
    2 FORMAT(6I5,F10.2)
    3 FORMAT (/,1X,'NUMBER OF PROBLEMS=',I5,5X,'NUMBER OF NODAL POINTS='
     +,I5,/,1X,'NUMBR OF NODAL POINT AT BOTTOM OF FOUNDATION=',I11,/,1X
     +,'NUMBER OF DIFFERENT SOIL LAYERS=',I5,5X,'INCRMENT DEPTH=',F10.2
     +,'    FT',/)
   11 FORMAT(1X,'DEPTH OF FOUNDATION =',12X,F10.2,' FEET')
   12 FORMAT(1X,'TOTAL DEPTH OF THE SOIL PROFILE =',F10.2,'     FEET')
   21 FORMAT(1X,'ELEMENT    NUMBER OF SOIL',/)
   32 FORMAT(I5,8X,I5)
   45 FORMAT(F10.2,2I5)
   46 FORMAT(3F10.2,I5)
   50 FORMAT(1X,'DEPTH TO WATER TABLE =',11X,F10.2,'     FEET',/)
   51 FORMAT(1X,'DISPLACEMENTS AT EACH DEPTH OUTPUT',/)
   52 FORMAT(1X,'TOTAL DISPLACEMENTS ONLY',/)
   61 FORMAT(1X,'EQUILIBRIUM SATURATED PROFILE ABOVE WATER TABLE',/)
   62 FORMAT(1X,'EQUILIBRIUM HYDROSTATIC PROFILE ABOVE WATER TABLE',/)
   90 FORMAT(/,1X,'APPLIED PRESSURE ON FOUNDATION=',F10.2,' TSF',/,1X,
     1'LENGTH =',F10.2,'    FEET',5X,'WIDTH =',F10.2,'   FEET',/)
  390 FORMAT(/,1X,'MATERIAL   SPECIFIC GRAVITY   WATER CONTENT,%     ',
     1'VOID RATIO',/)
  404 FORMAT(/,5X,'ERROR IN MATERIAL', I5)
  407 FORMAT(I5,3F18.3)
      END
C
C*******************************************************
C
      SUBROUTINE MECH(NMAT)
      PARAMETER(NL=30,NQ=101)
      COMMON/SLA/P(NQ),IE(NQ,1),EO(NL),DX,NBX,NEL,PII,NOUT
      DIMENSION SP(NL),CS(NL),CC(NL),PM(NL)
      WRITE(6,5)
      DO 10 I = 1,NMAT
      READ(5,*) M,SP(M),CS(M),CC(M),PM(M)
      IF(PM(M).LT.SP(M)) WRITE(6,14) SP(M),PM(M)
      IF(PM(M).LT.SP(M)) PM(M)=SP(M)
      WRITE(6,24)M,SP(M),CS(M),CC(M),PM(M)
   10 CONTINUE
C
      READ(5,*)   XA,XF
      WRITE(6,31) XA,XF
      DELH1=0.0
      DXX=0.0
      CALL PSAD(N1,N2,XA,XF,DXX,DX,NBX)
      IF(N1.GE.N2) GOTO 50
      IF(NOUT.EQ.0) GOTO 50
      WRITE(6,32)
      DO 40 I=N1,N2
      MTYP=IE(I,1)
      PR=(P(I)+P(I+1))/2.
      CA=SP(MTYP)/PR
```

```
      CB=SP(MTYP)/PM(MTYP)
      CBB=PM(MTYP)/PR
      E=EO(MTYP)+CS(MTYP)*ALOG10(CA)
      IF(PR.GT.PM(MTYP)) E=EO(MTYP)+CS(MTYP)*ALOG10(CB)+CC(MTYP)*ALOG10
     1(CBB)
      DEL=(E-EO(MTYP))/(1.+EO(MTYP))
      IF(NOUT.EQ.0) GOTO 36
      DELP=SP(MTYP)-PR
      WRITE(6,110) I,DXX,DEL,DELP
   36 DELH1=DELH1+DX*DEL
      DXX=DXX+DX
   40 CONTINUE
   50 DELH2=0.0
      IF(NBX.GT.NEL) GOTO 120
      DXX=FLOAT(NBX)*DX-DX/2.
      IF(NOUT.EQ.0) GOTO 65
      WRITE(6,60)
   65 DO 100 I=NBX,NEL
      MTYP=IE(I,1)
      PR=(P(I)+P(I+1))/2.
      CA=SP(MTYP)/PR
      CB=SP(MTYP)/PM(MTYP)
      CBB=PM(MTYP)/PR
      E=EO(MTYP)+CS(MTYP)*ALOG10(CA)
      IF(PR.GT.PM(MTYP))E=EO(MTYP)+CS(MTYP)*ALOG10(CB)+CC(MTYP)*ALOG10
     1(CBB)
      DEL=(E-EO(MTYP))/(1.+EO(MTYP))
      IF(NOUT.EQ.0) GOTO 80
      DELP=SP(MTYP)-PR
      WRITE(6,110) I,DXX,DEL,DELP
   80 DELH2=DELH2+DX*DEL
      DXX=DXX+DX
  100 CONTINUE
      DEL1=DELH1+DELH2
      WRITE(6,305) DELH1,DELH2,DEL1
  120 RETURN
    5 FORMAT(/,1X,'MATERIAL SWELL PRESSURE, SWELL COMPRESSION
     1      MAXIMUM PAST',/,1X,'   TSF   INDEX
     2      INDEX PRESSURE,TSF',/)
   11 FORMAT(I5,4F10.4)
   14 FORMAT(/,1X,'SWELL PRESSURE',F10.2,'    WAS SET GREATER THAN
MAXIM',
     1'UM PAST PRESSURE',F10.2,/,1X,'WHICH IS NOT POSSIBLE; SWELL PRESSU
     2RESET EQUAL TO MAXIMUM PAST PRESSURE',/)
   24 FORMAT(1X,I5,4F15.3)
   30 FORMAT(2F10.2)
   31 FORMAT(/,8X,'ACTIVE ZONE DEPTH (FT) =',F10.2,/,1X,'DEPTH ACTIVE ZO
     1NE BEGINS (FT) =',F10.2,/)
   32 FORMAT(/,1X,'HEAVE DISTRIBUTION ABOVE FOUNDATION DEPTH',/,1X,'ELEM
     1ENT   DEPTH,FT    DELTA HEAVE,FT   EXCESS PORE PRESSURE,TSF',/)
   60 FORMAT(/,1X,'HEAVE DISTRIBUTION BELOW FOUNDATION',/,1X,'ELEMENT
     1 DEPTH,FT  DELTA HEAVE,FT   EXCESS PORE PRESSURE,TSF',/)
  110 FORMAT(I5,F13.2,F18.5,5X,F18.5)
  305 FORMAT(/,1X,'SOIL HEAVE NEXT TO FOUNDATION EXCLUDING HEAVE',/,1X,
```

```
     1'IN SUBSOIL BENEATH FOUNDATION =',F8.5,'
      FEET',//,14X,'SUBSOIL',
     2'MOVEMENT =',F8.5,'    FEET',/,19X,'TOTAL HEAVE =',F8.5,'FEET')
      END
C
C*****************************************************************
C
      SUBROUTINE SLAB(Q,BLEN,BWID,MRECT,NBPRES,WT)
      PARAMETER (NL=30,NQ=101)
      COMMON/SLA/P(NQ),IE(NQ,1),EO(NL),DX,NBX,NEL,PII,NOUT
C
C     CALCULATION OF SURCHARGE PRESSURE FROM STRUCTURE
C
      NNP=NEL+1
      ANBX=FLOAT(NBX)*DX
      DXX=0.0
      BPRE1=Q-WT
      BPRES=BPRE1
      DO 100 I=NBX,NNP
      IF(DXX.LT.0.01) GOTO 80
      MTYP=IE(I-1,1)
      IF(NBPRES.EQ.2) GOTO 70
      BL=BLEN
      BW=BWID
      BPR=BPRES
      IF(MRECT.EQ.1) GOTO 50
      BL=BLEN/2.
      BW=BWID/2.
   50 VE2=(BL**2.+BW**2.+DXX**2.)/(DXX**2.)
      VE=VE2**0.5
      AN=BL*BW/(DXX**2.)
      AN2=AN**2.
      ENM=(2.*AN*VE/(VE2+AN2))*(VE2+1.)/VE2
      FNM=2.*AN*VE/(VE2-AN2)
      IF(MRECT.EQ.1)BPR=BPRES/4.
      AB=ATAN(FNM)
      IF(FNM.LT.0.) AB=PII+AB
      P(I)=P(I)+BPR*(ENM+AB)/PII
      GOTO 90
   70 DB=DXX/BWID
      PS=-0.157-0.22*DB
      IF(MRECT.EQ.0.AND.DB.LT.2.5)PS=-0.28*DB
      PS=10.**PS
      P(I)=P(I)+BPRES*PS
      GOTO 90
   80 P(I)=P(I)+BPRES
   90 DXX=DXX+DX
  100 CONTINUE
      RETURN
      END
C
C*****************************************************************
C
      SUBROUTINE PSAD(N1,N2,XA,XF,DXX,DX,NBX)
```

```
      AN1=XF/DX
      AN2=XA/DX
      N1=IFIX(AN1)+1
      N2=AN2
      DXX=XF+DX/2.
      N3=NBX-1
      IF(N2.GT.N3)N2=N3
      CONTINUE
      RETURN
      END
C
C*****************************************************************
C
      SUBROUTINE SCHMERT(Q,NMAT,DGWT,BWID,PP,NBPRES,JOPT)
      PARAMETER(NL=30,NQ=101)
      COMMON/SLA/P(NQ),IE(NQ,1),EO(NL),DX,NBX,NEL,PII,NOUT
      DIMENSION QC(NL),PP(NQ)
      IF(JOPT.EQ.2)WRITE(6,'(/,1X,A,/)')'MATERIAL  CONE RESISTANCE, TSF'
      IF(JOPT.EQ.4)WRITE(6,'(/,1X,A,/)')'MATERIAL  ELASTIC MODULUS, TSF'
      DO 10 I = 1,NMAT
        READ(5,*)  M,QC(M)
        WRITE(6,20)M,QC(M)
   10 CONTINUE
      READ(5,*)TIME
      WRITE(6,35)TIME
      NNP=NEL+1
      DELH=0.0
      DEL=0.0
      QNET=Q-PP(NBX)
      DXX=DX*FLOAT(NBX) - DX/2.
      C1=1 - 0.5*PP(NBX)/QNET
      IF(C1.LT.0.5) C1=0.5
      FF=TIME/0.1
      CT=1+0.2*ALOG10(FF)
      IF(NOUT.EQ.0) GOTO 40
      WRITE(6,25)
   40 DO 300 I=NBX,NEL
      MTYP=IE(I,1)
      PR1=(PP(I+1)+PP(I))/2.
      ESI=QC(MTYP)
      IF(NBPRES.EQ.1.AND.JOPT.EQ.2)ESI=2.5*QC(MTYP)
      IF(NBPRES.EQ.2.AND.JOPT.EQ.2)ESI=3.5*QC(MTYP)
      IF(NBPRES.EQ.2) GOTO 100
      ANN=0.5*BWID/DX + DX*FLOAT(NBX-1)
      NN=IFIX(ANN)
      SIGM=PR1
      AIZP=0.5+0.1*(QNET/SIGM)**0.5
      DEPT=DXX-FLOAT(NBX-1)*DX
      AIZ=0.1+(AIZP-0.1)*DEPT/(0.5*BWID)
      IF(DEPT.GT.0.5*BWID)AIZ=AIZP+AIZP/3.0-AIZP*DEPT/(1.5*BWID)
      IF(DEPT.GT.2*BWID)AIZ=0.0
      GOTO 200
  100 ANN=BWID/DX + DX*FLOAT(NBX-1)
      NN=IFIX(ANN)
```

```
    SIGM=PR1
    AIZP=0.5+0.1*(QNET/SIGM)**0.5
    DEPT=DXX-FLOAT(NBX-1)*DX
    AIZ=0.2+(AIZP-0.2)*DEPT/BWID
    IF(DEPT.GT.BWID)AIZ=AIZP+AIZP/3.-AIZP*DEPT/(3.*BWID)
    IF(DEPT.GT.4*BWID)AIZ=0.0
200 DEL=-C1*CT*QNET*AIZ*DX/ESI
    DELH=DELH+DEL
    IF(NOUT.EQ.1)WRITE(6,310)I,DXX,DEL
    DXX=DXX+DX
300 CONTINUE
    WRITE(6,320) DELH
    RETURN
 15 FORMAT(I5,F10.2)
 20 FORMAT(I5,F18.2)
 30 FORMAT(F10.2)
 35 FORMAT(/,1X,'TIME AFTER CONSTRUCTION IN YEARS=',F10.2,/)
 25 FORMAT(/,1X,'ELEMENT   DEPTH, FT   SETTLEMENT, FT ',/)
310 FORMAT(I5,F13.2,F18.5)
320 FORMAT(/,1X,'SETTLEMENT BENEATH FOUNDATION=',F10.5,'     FEET',/)
    END
```