

Table 26 The **GENOPT-user-written** abridged part of **SUBROUTINE STRUCT** in which the maximum effective stress and minimum buckling load factors are computed for the shell skin and for the isogrid stiffeners. This part of SUBROUTINE STRUCT was written by the GENOPT user. Both the GENOPT-created skeletal version of SUBROUTINE STRUCT and the complete version of SUBROUTINE STRUCT are listed in the appendix as Tables a14 and a16, respectively. The complete version of SUBROUTINE STRUCT is very long and constitutes a major part of the work on this project. This table presents only a short segment of SUBROUTINE STRUCT.

```
=====
C Find axisymmetric nonlinear equilibrium (INDIC=0) of imperfect shell
C at the design load, PRESS(ILOADX), with use of axisymmetric buckling
C modal imperfection mode 1.
C
  (many lines skipped to save space)
```

NOTE: SUBROUTINE BOSDEC generates a valid input file for BOSOR4 (or BIGBOSOR4) for an INDIC = 0 type of analysis:

```
      CALL BOSDEC(4,ILOADX,INDIC,IMPERF,24,IFILE8,
1          npoint,ainput,binput,LENCYL,nodes,WIMP,
1          WMODEX,xinput,xlimit,EMATL,NUMATL,DNMATL,
1          THKSKN,HIGHST,SPACNG,THSTIF,THKCYL,
1          PRESS,PMAX,N0BX,NMINBX,NMAXBX,INCRBX)

  (many lines skipped to save space)
C
      CALL B4READ      (execution of the BIGBOSOR4 preprocessor)
      CALL B4MAIN      (execution of the BIGBOSOR4 mainprocessor.
                        B4MAIN computes BUCMIN, BUCMNS, SKNMAX,
                        and STFMXS. bskin1, etc. are defined in
                        a footnote at the end of this table.)
C
  (lines skipped to save space)
```

```
do 363 iseg = 1,NSEG
  ipoint = iseg + 1
  if (xinput(ipoint).lt.xlimit) then
    bskin1 = min(bskin1,BUCMIN(iseg))
    bstif1 = min(bstif1,BUCMNS(iseg))
    sknmx1 = max(sknmx1,SKNMAX(iseg))
    stfmx1 = max(stfmx1,STFMXS(iseg))
  else
    bskin2 = min(bskin2,BUCMIN(iseg))
    bstif2 = min(bstif2,BUCMNS(iseg))
    sknmx2 = max(sknmx2,SKNMAX(iseg))
    stfmx2 = max(stfmx2,STFMXS(iseg))
```

```

        endif
363 continue
c
(many lines skipped to save space)

      IF (PMAx01.GE.0.90*PRESS(ILOADX)) THEN
        SKNBK1(ILOADX,1) = bskin1
        STFBK1(ILOADX,1) = bstif1
        SKNST1(ILOADX,1) = sknmx1
        STFST1(ILOADX,1) = stfm1
        SKNBK1(ILOADX,2) = bskin2
        STFBK1(ILOADX,2) = bstif2
        SKNST1(ILOADX,2) = sknmx2
        STFST1(ILOADX,2) = stfm2
        WAPEx1(ILOADX) = ABS(ENDUV)
      ENDIF

```

---

#### NOTES ON THIS TABLE

##### **DEFINITION OF VARIABLES:**

ILOADX = load set number  
 ENDUV = normal displacement at the apex of the shell  
 bskin1 = local skin buckling in Region 1  
 bstif1 = local isogrid stiffener buckling in Region 1  
 sknm1 = maximum effective stress in shell skin in Region 1  
 stfm1 = maximum stress in isogrid stiffener in Region 1  
 The same quantities with a "2" pertain to Region 2.  
 The quantities, SKNBK1, STFBK1, etc. are used in the  
 computation of behavioral constraints and design margins  
 that are computed in SUBROUTINE CONX, which is part of  
 the file, ..genopt/sources/main.src.

**SUBROUTINE BOSDEC** must be created by the GENOPT user. BOSDEC produces  
 a valid input file for BIGBOSOR4, such as that listed in  
 Table a17, for example. SUBROUTINE BOSDEC for the "equivellipse"  
 application is listed in Table a15.

**SEE TABLE a30** IN THE APPENDIX FOR A RELATIVELY SIMPLE EXAMPLE  
 IN WHICH THE SKELETAL "STRUCT" SUBROUTINE IS "FLESHED OUT"  
 BY THE GENOPT USER.