Table a47 What appears on the screen during the interactive "BEGIN" session corresponding to the input data for "BEGIN" listed in Table 35. This file has been abridged to save space. On the computer screen the user sees an echo of each input datum. These echoes have been omitted to save space. Also, many lines that are analogous to those listed here have been omitted, with the notation, "(many lines skipped to save space)". The "end" user's responses are in **bold face**.

```
================================================================
GENOPT = /home/progs/genopt

 THE NAME OF THE PROMPT FILE ASKED FOR NEXT
 IS THE NAME OF THE CLASS OF PROBLEMS THAT THE GENOPT-USER
 HAS CHOSEN, NOT THE NAME OF THE PARTICULAR CASE BEING
 STUDIED HERE. IT IS THE "NAME" PART OF "NAME".PRO.

  ENTER THE GENERIC CASE NAME: equivellipse

 FROM HERE ON, WHENEVER THE CASE NAME IS REQUESTED,
 YOU PROVIDE THE NAME OF THE PARTICULAR INSTANCE IN THE CLASS
 OF PROBLEMS THAT YOU ARE NOW STUDYING.  THIS NAME MUST BE
 DIFFERENT FROM THE NAME YOU HAVE JUST PROVIDED ABOVE.

  ENTER THE SPECIFIC CASE NAME: eqellipse

 ****************   BEGIN   ******************

 Purpose of BEGIN is to permit you to provide a starting design
 in an interactive mode. You give starting dimensions, material
 properties, allowables. The interactive session is stored on
 a file called eqellipse.BEG, in which eqellipse is a name that you
 have chosen for the specific case. (The name, eqellipse must
 remain the same as you use BEGIN, DECIDE, MAINSETUP, OPTIMIZE,
 and CHANGE.)  In future runs of the same or a
 slightly modified case, you will find it convenient to use the
 file eqellipse.BEG as input.  Rather than answer all the questions
 interactively, you can use eqellipse.BEG or an edited version of
 eqellipse.BEG as input to BEGIN.  BEGIN also generates an output
 file called eqellipse.OPB. OPB lists a summary of the case, and if
 you choose the tutorial option, the questions, helps, and your
 answers for each input datum.

 ************************************************

 Are you correcting, adding to, or using an existing file?= n
 Do you want a tutorial session and tutorial output?= n
```

Now you start to provide input data. You will be prompted by
short questions. If you need help, just type H as an
answer to the prompt instead of the datum called for. In most
instances you will then be given more information on the datum
you must provide. It may be a good idea to run the tutorial
option if you are a new user of this program.

Don't do the tutorial. I have not updated the tutorial capability and therefore it probably isn't any good.

OPTIMUM DESIGN OF ISOGRID-STIFFENED ELLIPSOIDAL HEAD
David Bushnell, retired (formerly with Lockheed Martin)
ABSTACT: The externally pressurized head is elastic, has
internal isogrid stiffening, and is attached to a short,
unstiffened cylindrical shell of uniform thickness.
The BIGBOSOR4 computer program is used for the structural
analysis and GENOPT is used to set up the user-friendly
optimization program. Please read the following papers
for descriptions of BIGBOSOR4 and GENOPT:
[1] Bushnell, D., "Automated optimum design of shells of
revolution with application to ring-stiffened cylindrical
shells with wavy walls", Proc. AIAA 41st SDM Meeting, AIAA
Paper No. AIAA-2000-1663, April 2000. (Also see the Lockheed
Martin report, LMMS P525674, November, 1999 for more details).
[2] Bushnell, D., "GENOPT - a program that writes user-friendly
optimization code", Int. J. Solids Structures, Vol. 26, No. 9/10
pp. 1173-1210, 1990

number of x-coordinates: npoint= **13**

DEFINITION OF THE ROW INDEX OF THE ARRAY, xinput =
vector element number for xinput

Number Ixinpu of rows in the array xinput: Ixinpu= **13**
x-coordinates for ends of segments: xinput(1)= **0.0**
x-coordinates for ends of segments: xinput(2)= **2.5545**
x-coordinates for ends of segments: xinput(3)= **5.66645**
x-coordinates for ends of segments: xinput(4)= **8.75363**
x-coordinates for ends of segments: xinput(5)= **11.7977**
x-coordinates for ends of segments: xinput(6)= **14.77232**
x-coordinates for ends of segments: xinput(7)= **17.63477**
x-coordinates for ends of segments: xinput(8)= **19.63631**
x-coordinates for ends of segments: xinput(9)= **21.26065**
x-coordinates for ends of segments: xinput(10)= **22.70426**
x-coordinates for ends of segments: xinput(11)= **23.86535**
x-coordinates for ends of segments: xinput(12)= **24.54286**

x-coordinates for ends of segments: xinput(13)= **24.75**
length of semi-major axis: ainput= **24.75**
length of semi-minor axis of ellipse: binput= **12.375**
number of nodal points per segment: nodes= **11**
max. x-coordinate for x-coordinate callouts: xlimit= **17.63477**

DEFINITION OF THE ROW INDEX OF THE ARRAY, THKSKN =
vector element number for xinput

skin thickness at xinput: THKSKN(1)= **0.4**
skin thickness at xinput: THKSKN(2)= **0.4**
skin thickness at xinput: THKSKN(3)= **0.4**
skin thickness at xinput: THKSKN(4)= **0.4**
skin thickness at xinput: THKSKN(5)= **0.4**
skin thickness at xinput: THKSKN(6)= **0.4**
skin thickness at xinput: THKSKN(7)= **0.4**
skin thickness at xinput: THKSKN(8)= **0.4**
skin thickness at xinput: THKSKN(9)= **0.4**
skin thickness at xinput: THKSKN(10)= **0.4**
skin thickness at xinput: THKSKN(11)= **0.4**
skin thickness at xinput: THKSKN(12)= **0.4**
skin thickness at xinput: THKSKN(13)= **0.4**

DEFINITION OF THE ROW INDEX OF THE ARRAY, HIGHST =
vector element number for xinput

height of isogrid members at xinput: HIGHST(1)= **1.**
height of isogrid members at xinput: HIGHST(2)= **1.**
height of isogrid members at xinput: HIGHST(3)= **1.**
height of isogrid members at xinput: HIGHST(4)= **1.**
height of isogrid members at xinput: HIGHST(5)= **1.**
height of isogrid members at xinput: HIGHST(6)= **1.**
height of isogrid members at xinput: HIGHST(7)= **1.**
height of isogrid members at xinput: HIGHST(8)= **1.**
height of isogrid members at xinput: HIGHST(9)= **1.**
height of isogrid members at xinput: HIGHST(10)= **1.**
height of isogrid members at xinput: HIGHST(11)= **1.**
height of isogrid members at xinput: HIGHST(12)= **1.**

height of isogrid members at xinput: HIGHST(13)= **1.**
spacing of the isogrid members: SPACNG= **3.**
thickness of an isogrid stiffening member: THSTIF= **0.1**
thickness of the cylindrical shell: THKCYL= **0.2**
radius of the cylindrical shell: RADCYL= **24.75**
length of the cylindrical segment: LENCYL= **0.**
amplitude of the axisymmetric imperfection: WIMP= **0.2**
elastic modulus: EMATL= **0.16E+08**
Poisson ratio of material: NUMATL= **0.25**
mass density of material: DNMATL= **0.4155E-03**
strategy control for imperfection shapes: IMODE= **2**
Number NCASES of load cases (environments): NCASES= **2**
uniform external pressure: PRESS(1)= **460.**
uniform external pressure: PRESS(2)= **460.**

DEFINITION OF THE ROW INDEX OF THE ARRAY, CLAPS1 =
Number of load cases (number of environments)

collapse pressure with imperfection mode 1: CLAPS1

collapse pressure with imperfection mode 1: CLAPS1

DEFINITION OF THE ROW INDEX OF THE ARRAY, CLAPS1A =
Number of load cases (number of environments)

allowable pressure for axisymmetric collapse: CLAPS1A(1)= **550.**
allowable pressure for axisymmetric collapse: CLAPS1A(2)= **550.**

DEFINITION OF THE ROW INDEX OF THE ARRAY, CLAPS1F =
Number of load cases (number of environments)

factor of safety for axisymmetric collapse: CLAPS1F(1)= **1.**
factor of safety for axisymmetric collapse: CLAPS1F(2)= **1.**

DEFINITION OF THE ROW INDEX OF THE ARRAY, GENBK1 =
Number of load cases (number of environments)

general buckling load factor, mode 1: GENBK1

general buckling load factor, mode 1: GENBK1

DEFINITION OF THE ROW INDEX OF THE ARRAY, GENBK1A =

Number of load cases (number of environments)

allowable general buckling load factor (use 1.0): GENBK1A(1)= **1.**
allowable general buckling load factor (use 1.0): GENBK1A(2)= **1.**

DEFINITION OF THE ROW INDEX OF THE ARRAY, GENBK1F =
Number of load cases (number of environments)

factor of safety for general buckling: GENBK1F(1)= **1.**
factor of safety for general buckling: GENBK1F(2)= **1.**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, SKNBK1 =
number of region for computing behavior

Number JSKNBK1 of columns in the array, SKNBK1: JSKNBK1= **2**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, SKNBK1 =
number of region for computing behavior

INPUT FOR COL. NO. 1 OF THE ARRAY SKNBK1

DEFINITION OF THE ROW INDEX OF THE ARRAY, SKNBK1 =
Number of load cases (number of environments)

local skin buckling load factor, mode 1: SKNBK1

local skin buckling load factor, mode 1: SKNBK1

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, SKNBK1 =
number of region for computing behavior

INPUT FOR COL. NO. 2 OF THE ARRAY SKNBK1

DEFINITION OF THE ROW INDEX OF THE ARRAY, SKNBK1 =
Number of load cases (number of environments)

local skin buckling load factor, mode 1: SKNBK1
local skin buckling load factor, mode 1: SKNBK1

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, SKNBK1A =
number of region for computing behavior

INPUT FOR COL. NO. 1 OF THE ARRAY SKNBK1A

DEFINITION OF THE ROW INDEX OF THE ARRAY, SKNBK1A =
Number of load cases (number of environments)

allowable buckling load factor: SKNBK1A(1, 1)= **1.**
allowable buckling load factor: SKNBK1A(2, 1)= **1.**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, SKNBK1A =
number of region for computing behavior

INPUT FOR COL. NO. 2 OF THE ARRAY SKNBK1A

DEFINITION OF THE ROW INDEX OF THE ARRAY, SKNBK1A =
Number of load cases (number of environments)

allowable buckling load factor: SKNBK1A(1, 2)= **1.**
allowable buckling load factor: SKNBK1A(2, 2)= **1.**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, SKNBK1F =
number of region for computing behavior

INPUT FOR COL. NO. 1 OF THE ARRAY SKNBK1F

DEFINITION OF THE ROW INDEX OF THE ARRAY, SKNBK1F =
Number of load cases (number of environments)

factor of safety for skin buckling: SKNBK1F(1, 1)= **1.**
factor of safety for skin buckling: SKNBK1F(2, 1)= **1.**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, SKNBK1F =
number of region for computing behavior

INPUT FOR COL. NO. 2 OF THE ARRAY SKNBK1F

DEFINITION OF THE ROW INDEX OF THE ARRAY, SKNBK1F =
Number of load cases (number of environments)

factor of safety for skin buckling: SKNBK1F(1, 2)= **1.**
factor of safety for skin buckling: SKNBK1F(2, 2)= **1.**

(many lines skipped to save space)

DEFINITION OF THE ROW INDEX OF THE ARRAY, WAPEX1 =
Number of load cases (number of environments)

normal (axial) displacement at apex, mode 1: WAPEX1

normal (axial) displacement at apex, mode 1: WAPEX1

DEFINITION OF THE ROW INDEX OF THE ARRAY, WAPEX1A =
 Number of load cases (number of environments)

allowable normal (axial) displacement at apex: WAPEX1A(1)= **0.7**
allowable normal (axial) displacement at apex: WAPEX1A(2)= **0.7**

DEFINITION OF THE ROW INDEX OF THE ARRAY, WAPEX1F =
 Number of load cases (number of environments)

factor of safety for WAPEX: WAPEX1F(1)= **1.**
factor of safety for WAPEX: WAPEX1F(2)= **1.**

DEFINITION OF THE ROW INDEX OF THE ARRAY, CLAPS2 =
 Number of load cases (number of environments)

collapse pressure with imperfection mode 2: CLAPS2

collapse pressure with imperfection mode 2: CLAPS2

DEFINITION OF THE ROW INDEX OF THE ARRAY, CLAPS2A =
 Number of load cases (number of environments)

allowable pressure for axisymmetric collapse: CLAPS2A(1)= **550.**
allowable pressure for axisymmetric collapse: CLAPS2A(2)= **550.**

DEFINITION OF THE ROW INDEX OF THE ARRAY, CLAPS2F =
 Number of load cases (number of environments)

factor of safety for axisymmetric collapse: CLAPS2F(1)= **1.**
factor of safety for axisymmetric collapse: CLAPS2F(2)= **1.**

(many lines skipped to save space)

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, STFST2 =
 number of region for computing behavior

  INPUT FOR COL. NO. 1 OF THE ARRAY STFST2

DEFINITION OF THE ROW INDEX OF THE ARRAY, STFST2 =
 Number of load cases (number of environments)

maximum stress in isogrid stiffener, mode 2: STFST2

maximum stress in isogrid stiffener, mode 2: STFST2

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, STFST2 =
 number of region for computing behavior

  INPUT FOR COL. NO. 2 OF THE ARRAY STFST2

DEFINITION OF THE ROW INDEX OF THE ARRAY, STFST2 =
 Number of load cases (number of environments)

maximum stress in isogrid stiffener, mode 2: STFST2
maximum stress in isogrid stiffener, mode 2: STFST2

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, STFST2A =
 number of region for computing behavior

  INPUT FOR COL. NO. 1 OF THE ARRAY STFST2A

DEFINITION OF THE ROW INDEX OF THE ARRAY, STFST2A =
 Number of load cases (number of environments)

allowable stress in isogrid stiffeners: STFST2A(1, 1)= **120000.**
allowable stress in isogrid stiffeners: STFST2A(2, 1)= **120000.**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, STFST2A =
 number of region for computing behavior

  INPUT FOR COL. NO. 2 OF THE ARRAY STFST2A

DEFINITION OF THE ROW INDEX OF THE ARRAY, STFST2A =
 Number of load cases (number of environments)

allowable stress in isogrid stiffeners: STFST2A(1, 2)= **120000.**
allowable stress in isogrid stiffeners: STFST2A(2, 2)= **120000.**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, STFST2F =
 number of region for computing behavior

  INPUT FOR COL. NO. 1 OF THE ARRAY STFST2F

DEFINITION OF THE ROW INDEX OF THE ARRAY, STFST2F =
 Number of load cases (number of environments)

factor of safety for stress in isogrid member: STFST2F(1, 1)= **1.**
factor of safety for stress in isogrid member: STFST2F(2, 1)= **1.**

DEFINITION OF THE COLUMN INDEX OF THE ARRAY, STFST2F =
 number of region for computing behavior

  INPUT FOR COL. NO. 2 OF THE ARRAY STFST2F

DEFINITION OF THE ROW INDEX OF THE ARRAY, STFST2F =
 Number of load cases (number of environments)

factor of safety for stress in isogrid member: STFST2F(1, 2)= **1.**
factor of safety for stress in isogrid member: STFST2F(2, 2)= **1.**

DEFINITION OF THE ROW INDEX OF THE ARRAY, WAPEX2 =
 Number of load cases (number of environments)

normal (axial) displacement at apex, mode 2: WAPEX2

normal (axial) displacement at apex, mode 2: WAPEX2

DEFINITION OF THE ROW INDEX OF THE ARRAY, WAPEX2A =
 Number of load cases (number of environments)

allowable normal (axial) displacement at apex: WAPEX2A(1)= **0.7**
allowable normal (axial) displacement at apex: WAPEX2A(2)= **0.7**

DEFINITION OF THE ROW INDEX OF THE ARRAY, WAPEX2F =
 Number of load cases (number of environments)

factor of safety for WAPEX: WAPEX2F(1)= **1.**
factor of safety for WAPEX: WAPEX2F(2)= **1.**
weight of the equivalent ellipsoidal head: WEIGHT

 28 decision variable candidates have now been identified.
 50 decision variable candidates are permitted.
 22 additional decision variable candidates are allowed.

 23 fixed parameters have now been identified.
 99 fixed parameters are permitted.
 76 additional fixed parameters are allowed.

  2 environmental parameters have now been identified.
 50 environmental parameters are permitted.
 48 additional environmental parameters are allowed.

 44 allowables have now been identified.
 99 allowables are permitted.
 55 additional allowables are permitted.

```
 44 factors of safety have now been identified.
 99 factors of safety are permitted.
 55 additional factors of safety are allowed.


DESCRIPTION OF FILES GENERATED BY THIS CASE:

eqellipse.NAM = This file contains only the name of the case.
eqellipse.BEG = Summary of interactive session you have just
         completed. This file can be edited and used for
         future runs of BEGIN.

eqellipse.CBL = Contains the eqellipse data base.

eqellipse.OPB = Output from BEGIN. Please list this file and
         inspect it and the eqellipse.BEG file carefully before
         proceeding.

For further information about files generated during operation
of GENOPT give the command HELPG FILES.

Next, give the command   DECIDE or CHANGE   .
================================================================
```