STAIRWAY DESIGN TASK

Auxiliary Menu 1A - Stairway Parameters (Feet)

```
SELECT FROM MENU TO SET PARAMETERS.
THEN EITHER ITEM 39 OR 40 WHEN DONE

10 CONFIGURATION = NARROW "U"                                  * HANDRAILS *   ** ACTION **
11 FLR.TO FLR.HT.= 10.00          25 SEP.=8.00"                32 WD.=1.50"    39 DRAW PLAN
12 STAIRWAY WIDTH= 44.00"         26 LANDTH=3.00"              33 HT.=32.00"   40 DRAW SECTION
** RISERS **  ** TREADS **  ** NOSINGS **  * STRINGERS *
14 MAX.=7.50"  21 MIN.=10.00"  28 DEPTH =1.00"  35 WD.=1.50"    42 BLDG.CODE
15 ACT.=7.50"  22 ACT.=10.00"  29 THICK.=1.00"  36 HT.=10.50"   43 NO 3D PROP
16 QTY.=16     23 THK.=1.50"                    37 OUTSIDE
```

Auxiliary Menu 1B - Stairway Parameters (MM)

```
SELECT FROM MENU TO SET PARAMETERS.
THEN EITHER ITEM 39 OR 40 WHEN DONE

10 CONFIGURATION = NARROW "U"                                  * HANDRAILS *   ** ACTION **
11 FLR.TO FLR.HT.= 3000.00        25 SEP.=200.00               32 WD.=37.50    39 DRAW PLAN
12 STAIRWAY WIDTH= 1100.00        26 LANDTH=75.00              33 HT.=800.00   40 DRAW SECTION
** RISERS **  ** TREADS **  ** NOSINGS **  * STRINGERS *
14 MAX.=187.50 21 MIN.=250.00  28 DEPTH =25.00  35 WD.=37.50    42 BLDG.CODE
15 ACT.=187.50 22 ACT.=250.00  29 THICK.=25.00  36 HT.=262.50   43 NO 3D PROP
16 QTY.=16     23 THK.=37.50                    37 OUTSIDE
```

Auxiliary Menu 1C - Stairway Parameters (CM)

```
SELECT FROM MENU TO SET PARAMETERS.
THEN EITHER ITEM 39 OR 40 WHEN DONE

10 CONFIGURATION = NARROW "U"                                  * HANDRAILS *   ** ACTION **
11 FLR.TO FLR.HT.= 300.00         25 SEP.=20.00                32 WD.=3.75     39 DRAW PLAN
12 STAIRWAY WIDTH= 110.00         26 LANDTH=7.50               33 HT.=80.00    40 DRAW SECTION
** RISERS **  ** TREADS **  ** NOSINGS **  * STRINGERS *
14 MAX.=18.75  21 MIN.=25.00  28 DEPTH =2.50  35 WD.=3.75      42 BLDG.CODE
15 ACT.=18.75  22 ACT.=25.00  29 THICK.=2.50  36 HT.=26.25     43 NO 3D PROP
16 QTY.=16     23 THK.=3.75                     37 OUTSIDE
```

Auxiliary Menu 2 - Building Code Selection

```
SELECT FROM MENU OR REJECT

** CODE **
11 U.B.C.
12 B.O.C.A.
13 ANY OTHER USED DEFINED.
```

Auxiliary Menu 3 - Building Code Sub-classification Selection

```
SELECT FROM MENU OR REJECT

** CODE **
11 PRIVATE STAIR LESS THAN 10 PERSONS
12 PUBLIC STAIRS LESS THAN 50 PERSONS
13 PUBLIC STAIRS MORE THAN 50 PERSONS
```

STAIRWAY DESIGN - GENERAL

Stair Design - General Description

This Task creates either a PLAN or SECTION view of a stairway based on parameters specified by the operator. The stairway is created accurately to scale & conforms to code requirements as well as standard design formulas. Considerable checking is performed to insure that dimension entries are within allowable ranges. It should be recognized, however, that in certain cases it is possible to override Code limits. This is intentional to allow for special conditions. Care should be taken in such cases to avoid illegal designs.

Text File - usr/IGS/D3/TX/ADP86C

When this task is first selected, A text file is read into memory. This text file "D5/TX/ADP86C" contains all text strings that are used by this task. Certain of these text strings may be edited to allow local language prompting. Once the text strings are in memory, Auxiliary Menu 1 is displayed. Following is a listing of the text file:

Note that the first two lines are the main prompts which are displayed at the top of the menu. Lines 3-8 are the six stair types which appear at menu position 10. Lines 10-44 correspond to the same menu positions. Lines 45-47 are alternate text for menu items 37 & 43. All other lines are prompts which appear at the top of the menu when various menu items are selected. Many of these are actually concatenated to form the prompt which is displayed. Care must be taken when any of these are edited to avoid excess length.

```
 1  0:SELECT FROM MENU TO SET PARAMETERS.
 2  0:THEN EITHER ITEM 39 OR 40 WHEN DONE
 3  0: NARROW "U"
 4  0: WIDE "U"
 5  0: STRAIGHT
 6  0: "L" TYPE
 7  0: CIRCULAR
 8  0: WINDING
 9  0:SELECT FROM MENU OR REJECT
10  0:CONFIGURATION =
11  0:FLR.TO FLR.HT.=
12  0:TREAD WIDTH    =
13  1:**  RISERS  **
14  0:MAX.=
15  0:ACT.=
16  0:QTY.=
17  0:
18  0:
19  0:
20  1:**  TREADS  **
21  0:MIN.=
22  0:ACT.=
23  0:THK.=
24  0:
25  0:SEP.=
26  0:LANDTH=
27  1:**  NOSINGS **
28  0:DEPTH =
29  0:THICK.=
30  0:
31  1:*  HANDRAILS *
32  0:WD.=
33  0:HT.=
34  1:*  STRINGERS *
35  0:WD.=
36  0:HT.=
37  0:OUTSIDE
38  1:**  ACTION  **
39  0:DRAW PLAN
40  0:DRAW SECTION
41  0:
42  0:BLDG.CODE
43  0:NO 3D PROP
44  0:
45  0:WITH 3D PROP
46  0:INSIDE
47  0:NO STRINGERS
48  0:TOO SMALL - TRY AGAIN
49  0:TOO LARGE - TRY AGAIN
50  0:ENTER DESIRED
51  0:ENTER MAXIMUM
52  0:ENTER MINIMUM
53  0: FLOOR HEIGHT
54  0: STAIRWAY TREAD WIDTH
55  0: ALLOWABLE RISER HEIGHT
56  0: RISER HEIGHT
57  0: NUMBER OF RISERS
58  0: TREAD SIZE
59  0: TREAD THICKNESS
60  0: SEPARATION
61  0: LANDING THICKNESS
62  0: NOSING DEPTH
63  0: NOSING THICKNESS
64  0: HANDRAIL WIDTH
65  0: HANDRAIL HEIGHT
66  0: STRINGER WIDTH
67  0: STRINGER HEIGHT
68  0:FLOOR HEIGHT TOO LARGE
69  0:NOT ENOUGH RISERS
70  0:PICK APPROXIMATE LOCATION FOR STAIR
71  0:ENTER THE DESIRED
72  0: INSIDE RADIUS
73  0: OUTSIDE DIAMETER
74  0:AT LEAST 2 TIMES THE TREAD WIDTH
75  0:OR SELECT FROM MASTER MENU
76  0:ENTER NUMBER OF RISERS FOR
77  0: CENTER FLIGHT
78  0: BOTTOM FLIGHT
79  0: FOR THIS CONFIGURATION
```

The first two characters of each line must not be changed as they specify whether the displayed information is a selectable menu item or simply a note or header line.

Code File -
usr/IGS/D5/CD/STCODE

A second text file is used by this task to retrieve Building Code Limits. This file has a specific format to allow the proper retieval of dimensional data. The following is a listing of the file as it is initially supplied. You may add to the file as long as you adhere to this format.

```
1  U.B.C
2    PRIVATE STAIR LESS THAN 10 PERSONS
3       0.6667 0.7500 2.5000 0.1250 2.6667 2.8333 0.6667 12.000
4    PUBLIC STAIRS LESS THAN 50 PERSONS
5       0.6250 0.8333 3.0000 0.1250 2.6667 2.8333 0.6667 12.000
6    PUBLIC STAIRS MORE THAN 50 PERSONS
7       0.6250 0.8333 3.6667 0.1250 2.6667 2.8333 0.6667 12.000
```

Each line must contain exactly 70 chars. followed by a carriage return .

If the first character of a line is not a blank space then it represents a top level Code. After that, the subclassifications are listed (such as lines 2,4 & 6 followed by the dimensional data.)

A line containing a top level Code must have no more than 8 valid characters that will be displayed on the menu. Any extras will be ignored.

A line containing a subclassification must start with 2 blanks and contain no more than 36 additional characters for the menu display. Additional characters will be ignored.

The dimensional data lines start with 4 blank spaces and followed by eight 6 character fields each field separated by 2 spaces. The fields contain the following numeric data:

1. Maximum allowable riser height
2. Minimum allowable tread depth
3. Minimum allowable tread width
4. Minimum allowable handrail width
5. Minimum allowable handrail height
6. Maximum allowable handrail height
7. Default separation for Narrow "U"
8. Maximum allowable height per flight.

Dimensional Values

All of the menu items which display values use the initial default values shown. The values are displayed in the application units of the drawing except in the case of an English Drawing. In that case, all of the values are shown in inches except for item 11 (FLR.TO FLR.HT.) which will be in feet if the Appl. unit is feet. In any event, input should be in application units.

General Operation

Basically, this task allows the parameters for a Stairway to be established by the selection and modification of the data displayed on the menu. When the displayed information corresponds to your desires, you may select either item 39 or item 40 to initiate the actual stairway creation.

The Task creates more detail for a Stair Plan View when the scale is 1:48 (1/4") or larger. In this case the risers will be drawn as dashed lines and the nosings will be solid lines. At smaller scales it will make the risers solid lines and will not draw the nosings. In addition, when a Plan View is created it may be specified to have 3D Properties, thus allowing the Projections Task to be used without any additional information being required.

Auxiliary Menu 1A - Stairway Parameters (Feet)

```
SELECT FROM MENU TO SET PARAMETERS.
THEN EITHER ITEM 39 OR 40 WHEN DONE

10 CONFIGURATION = NARROW "U"                          * HANDRAILS *   ** ACTION **
11 FLR.TO FLR.HT.= 10.00          25 SEP.=8.00"        32 WD.=1.50"    39 DRAW PLAN
12 STAIRWAY WIDTH= 44.00"         26 LANDTH=3.00"      33 HT.=32.00"   40 DRAW SECTION
** RISERS **  ** TREADS **  ** NOSINGS **  * STRINGERS *
14 MAX.=7.50"  21 MIN.=10.00"  28 DEPTH =1.00"  35 WD.=1.50"    42 BLDG.CODE
15 ACT.=7.50"  22 ACT.=10.00"  29 THICK.=1.00"  36 HT.=10.50"   43 NO 3D PROP
16 QTY.=16     23 THK.=1.50"                    37 OUTSIDE
```

Note: For default values when Application units are MM or CM see Auxiliary Menus 1B & 1C.

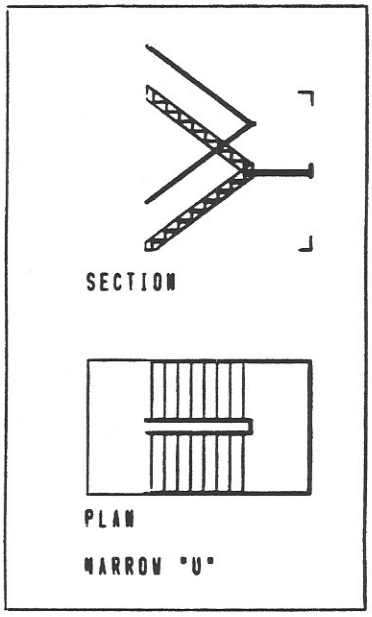
AUXILIARY MENU 1

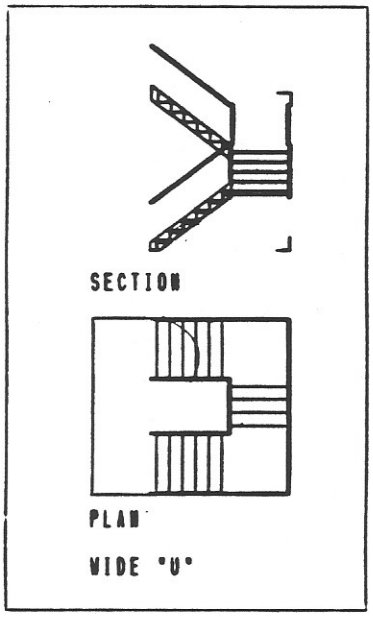
General Description

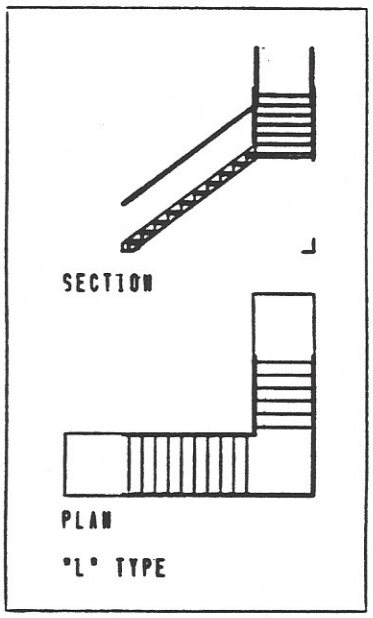
This menu provides the interaction needed to define the parameters for Stairways. Once the parameters are set as desired, you may select either Item 39 or 40 to initiate the actual creation of the Stair.

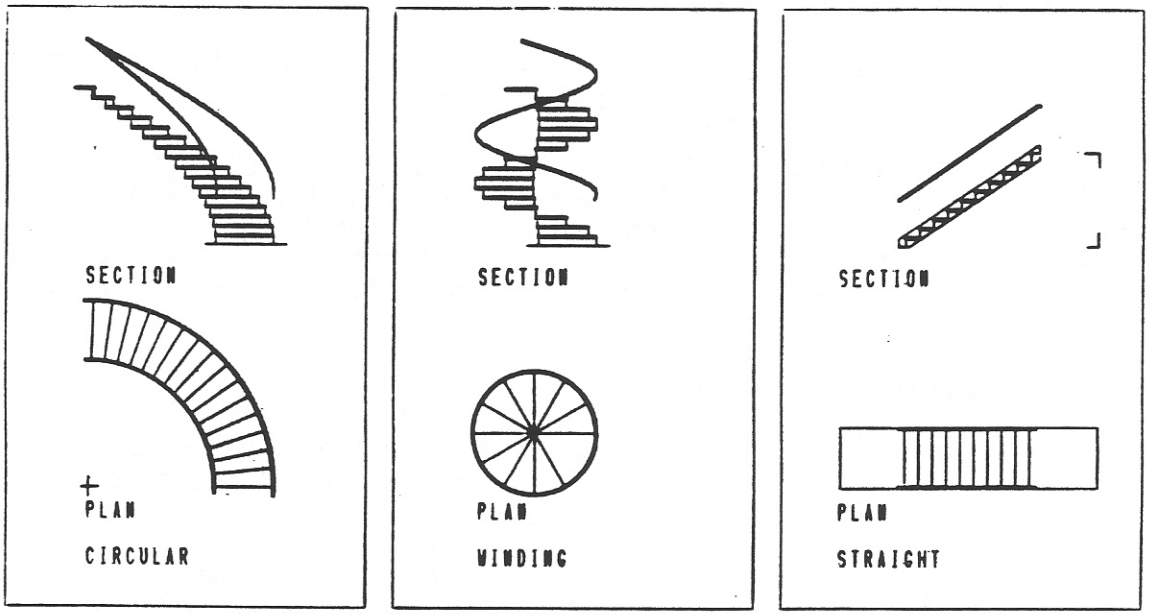
Configuration

There are six configurations of stairways that can be created by this task. Below are examples of these configurations. In order to change the configuration that is to be created, select Item 10. This is a toggle that changes each time you select it.









Dimensions

As you select and modify menu items for dimensional values you will note that by changing one value, other values also get changed. Basically, the Floor-Floor Ht., Actual Riser Ht., Quantity of Risers, and the Actual Tread Depth are all related and modification of one may affect the others.

The following basic relationships are used in the calculation of these values.

FLR.TO FLR.HT.= (QTY) x (ACT.RISER)

ACT.RISER < or = MAX.RISER

(ACT.TREAD)+(2 x ACT.RISER) = 25 ins.

The actual way that these relationships are used depends on the variable which is entered. For example, if the actual riser height is entered, the floor height will be modified as will the actual tread size. If on the other hand, the riser quantity is entered, only the floor height will be affected.

GENERAL PARAMETERS

10 CONFIGURATION = NARROW "U"

Purpose: To specify the stairway configuration that is to be created. This item is a Toggle.

Operation: Select Item 10. The configuration will change each time this item is selected. Note that the configuration can have an effect on some other items. Example: For a NARROW "U" Stairway, QTY. will always be even.

11 FLR.TO FLR.HT.= 10.00

Purpose: To specify the desired actual Floor to Floor Height to be used in the creation of the stairway.

Range Allowed:

Min.= Max.Riser Height

Max.= No limitation

Operation: Select Item 11. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 11 and the values in Menu Items 15,16,22 & 23 will be recalculated and displayed.

12 STAIRWAY WIDTH= 44.00"

Purpose: To specify the desired actual Stairway Width which is to be used in the creation of the stairway.

Range Allowed:

Min.= Minumum Allowable Width

Max.= No limitation

Operation: Select Item 12. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 12.

25 SEP.=8.00"

Purpose: To specify the desired actual Separation between Runs to be used in the creation of the NARROW "U" Stairway.

Range Allowed:

Min.= Stringer Width

Max.= No limitation

Operation: Select Item 25. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 25.

26 LANDTH=3.00"

Purpose: To specify the desired actual Landing Thickness to be used in the creation of the stairway.

Range Allowed:

Min.= Tread Thickness

Max.= Maximum Riser Height

Operation: Select Item 26. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 26.

** RISERS **

14 MAX.=7.50"

Purpose: To specify the maximum allowable Riser Height to be used in the creation of the stairway.

Range Allowed:

Min.= 0

Max.= 2 x Current Value

Operation: Select Item 14. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 14 and the values in Menu Items 15,16,22 & 23 will be recalculated and displayed

15 ACT.=7.50"

Purpose: To specify the desired actual Riser Height to be used in the creation of the stairway.

Range Allowed:

Min.= (Max.Riser) / 2

Max.= Max.Riser Height

Operation: Select Item 15. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 15 and the values in Menu Items 11,16,22 & 23 will be recalculated and displayed

16 QTY.=16

Purpose:

To specify the desired actual Number of Risers to be used in the creation of the stairway.

Range Allowed:

Min.= 2

Max.= 3 x Maximum Height between Landings / Act. Riser Ht

Operation:

Select Item 16. Then enter the desired value.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 16 and the value in Menu Item 11 will be recalculated and displayed

** TREADS **

21 MIN.=10.00"

Purpose: To specify the minimum allowable Tread Size (depth) to be used in the creation of the stairway.

Range Allowed:

Min.= Max.Riser / 4

Max.= Max.Riser x 3

Operation: Select Item 21. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 21 and the values in Menu Items 15,16,22 & 23 will be recalculated and displayed

22 ACT.=10.00"

Purpose: To specify the desired actual Tread Size (depth) that is to be used in the creation of the stairway.

Range Allowed:

Min.= Min.Tread

Max.= Min.Tread x 2

Operation: Select Item 22. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 22.

23 THK.=1.50"

Purpose: To specify the desired actual Tread Thickness to be used in the creation of the stairway.

Range Allowed:

Min.= Max.Riser Ht. / 10

Max.= Act.Riser Ht.

Operation: Select Item 23. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 23.

**** NOSINGS ****

28 DEPTH =1.00"

Purpose: To specify the desired actual Nosing Size (depth) to be used in the creation of the stairway.

Range Allowed:

Min.= 0

Max.= Act.Tread / 5

Operation: Select Item 28. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 28.

29 THICK.=1.00"

Purpose: To specify the desired actual Nosing size (thickness) to be used in the creation of the stairway.

Range Allowed:

Min.= Act.Riser / 8

Max.= Act.Riser

Operation: Select Item 29. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 29.

* HANDRAILS *

32 WD.=1.50"

Purpose: To specify the desired actual Handrail Width (Diam.) to be used in the creation of the stairway.

Range Allowed:

Min.= Min.allowable by Code default=1.25" or 3.25 cm.

Max.= 2 x Min.allowable by Code

Operation: Select Item 32. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 32.

33 HT.=32.00"

Purpose: To specify the desired actual Handrail Height to be used in the creation of the stairway.

Range Allowed:

Min.= Min.Ht.allowable by Code default=30.00" or 75 cm.

Max.= Max.Ht.allowable by Code default=34.00" or 85 cm.

Operation: Select Item 33. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 33.

*** STRINGERS ***

35 WD.=1.50"

Purpose: To specify the desired actual Stringer Width to be used in the creation of the stairway.

Range Allowed:

Min.= Max.Riser / 6

Max.= Max.Riser

Operation: Select Item 35. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 35.

36 HT.=10.50"

Purpose: To specify the desired actual Stringer Height to be used in the creation of the stairway.

Range Allowed:

Min.= 3 x Max.Riser Ht. / 2

Max.= 2 x Min.Tread Depth

Operation: Select Item 36. Then enter the desired value in Application Units.

If the value is not within the allowable range a message will be displayed which indicates the nature of the error and you may reenter the correct value.

Once an allowable value has been entered, it will be displayed in Menu Item 36.

** ACTION **

39 DRAW PLAN

Purpose: To indicate that the parameters shown are as desired and to initiate the creation of the Plan View of the Stairway.

Operation: Select Item 39. The System will prompt you to pick a location for the Stairway to be created. After you pick a location, and answer any other required questions the stairway will be created and displayed at the picked location. This Plan View is a Group and as such may be moved, copied, rotated or mirrored as desired. It is not recommened that it be scaled however since that would invalidate the dimensional accuracy.

After the Stairway has been created and displayed, you may reject it if desired.

Also note that the parameters have not changed and you may therfor create the corresponding section or a different configuration using the same dimensional values.

40 DRAW SECTION

Purpose: To indicate that the parameters shown are as desired and to initiate the creation of the Section View of the Stairway.

Operation: Select Item 40. The System will prompt you to pick a location for the Stairway to be created. After you pick a location, and answer any other required questions the stairway will be created and displayed at the picked location. The Section is a Group and as such may be moved or copied as desired. It is not recommened that it be scaled however since that would invalidate the dimensional accuracy.

After the Stairway has been created and displayed, you may reject it if desired.

Also note that the parameters have not changed and you may therfor create the corresponding Plan View or a different configuration using the same dimensional values.

42 BLDG.CODE

Purpose: To display Auxiliary Menu 2.

Operation: Select Item 42. Auxiliary Menu 2 will be displayed.

43 NO 3D PROP
WITH 3D PROP

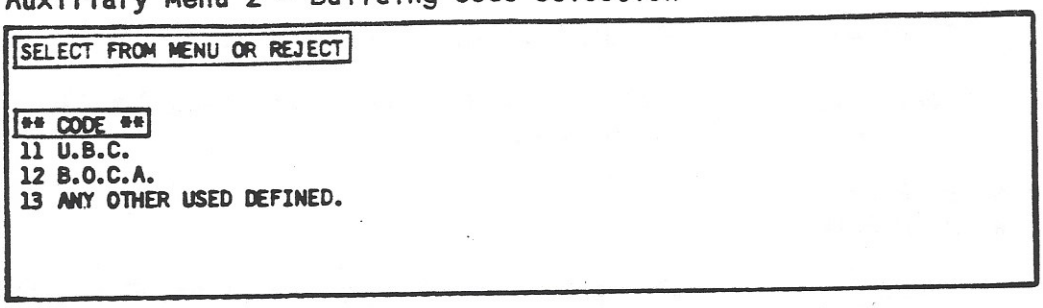
Purpose: To specify whether the resulting Plan View should have 3D Properties assigned so that the "PROJECTIONS" Task can be used to make wire frame views of the Stairway.

Operation: Select Item 43. This item is a Toggle. Each time it is selected the display will change to the alternate mode. In order to use the "WITH 3D PROP" function, you must have within FORMAT-FL, a format as follows

FORMAT NAME = 3D
Three real Floating Point Props. are required within this format, each having at least 2 decimal places of accuracy. They must have the following names:
ELEVATIO
HEIGHT
DEPTH

The default for this Menu Item is to not add the Properties. The reason is based on speed of operation. Typically, adding the 3D Properties will take approximately 10-12 seconds extra. You shoud not use this option unless you really want to make Isometric or Perspective Views of Stairs.

Auxiliary Menu 2 - Building Code Selection



AUXILIARY MENU 2

General Description — This menu displays the top level Codes that are available from the Code File and allows selection of the Building Code which is to be used. See the discussion of this file.

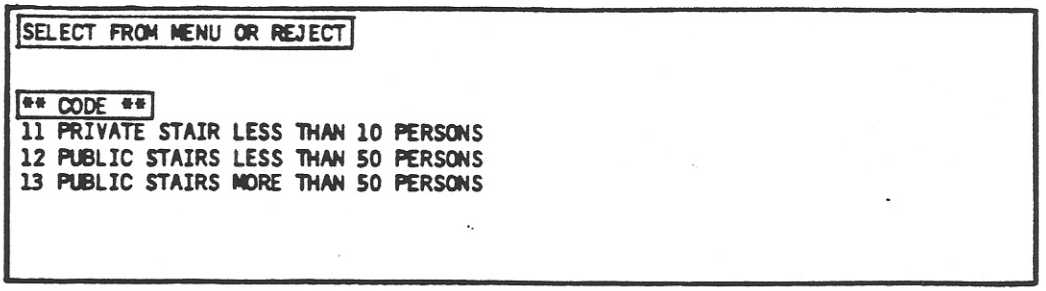
** CODE **

11 U.B.C.
12 B.O.C.A.
13 Any other user defined Building Code

Purpose: To specify the Building Code desired.

Operation: Select the item desired. Auxiliary Menu 3 will be displayed.

Auxiliary Menu 3 - Building Code Sub-classification Selection



AUXILIARY MENU 3

General Description — This menu displays the subclassifications available for the Building Code which was selected from Auxiliary Menu 2. See the discription of the Code File .

** CODE **

11 PRIVATE STAIR LESS THAN 10 PERSONS
12 PUBLIC STAIRS LESS THAN 50 PERSONS
13 PUBLIC STAIRS MORE THAN 50 PERSONS

Purpose: To specify the subclassification desired for the stairway being design, thereby setting the limits for the dimensions to be used.

Operation: Select the desired item. The dimensions for that item will be extracted from the file and Auxiliary Menu 1A,1B or 1C will be displayed. The values of the various menu items will have been recalculated based on the code limits extracted.