

**\*DEFINE\_FORMING\_BLANKMESH**

Purpose: This keyword, together with keyword \*ELEMENT\_BLANKING, enable mesh generation for a sheet metal blank. This keyword is renamed from the previous keyword \*CONTROL\_FORMING\_BLANKMESH. The keyword \*DEFINE\_CURVE\_TRIM\_NEW can be coupled with this keyword to define a blank with a complex periphery and a number of inner hole cutouts.

Card 1            1            2            3            4            5            6            7            8

Variable	IDMSH	ELENG	XLENG	YLENG	ANGLEX	NPLANE	CID	
Type	I	F	F	F	F	I	I	
Default	none	0.0	0.0	0.0	0.0	1	0	

Card 2            1            2            3            4            5            6            7            8

Variable	PIDBK	NID	EID	XCENT	YCENT	ZCENT	XSHIFT	YSHIFT
Type	I	I	I	F	F	F	F	F
Default	1	1	1	0.0	0.0	0.0	0.0	0.0

**VARIABLE****DESCRIPTION**

IDMSH	ID of the blankmesh (not the blank PID); must be unique.
ELENG	Element edge length.
XLENG	Length of the rectangular blank along X-axis in the coordinate system (CID) defined.
YLENG	Length of the rectangular blank along Y-axis in the coordinate system (CID) defined.
ANGLEX	An angle defined about Z-axis of the CID specified, starting from the X-axis as the zero degree, to rotate the blank and the orientation of the mesh to be generated. The sign of the rotation angle follows the right hand rule. See <b>Remark 3</b> .

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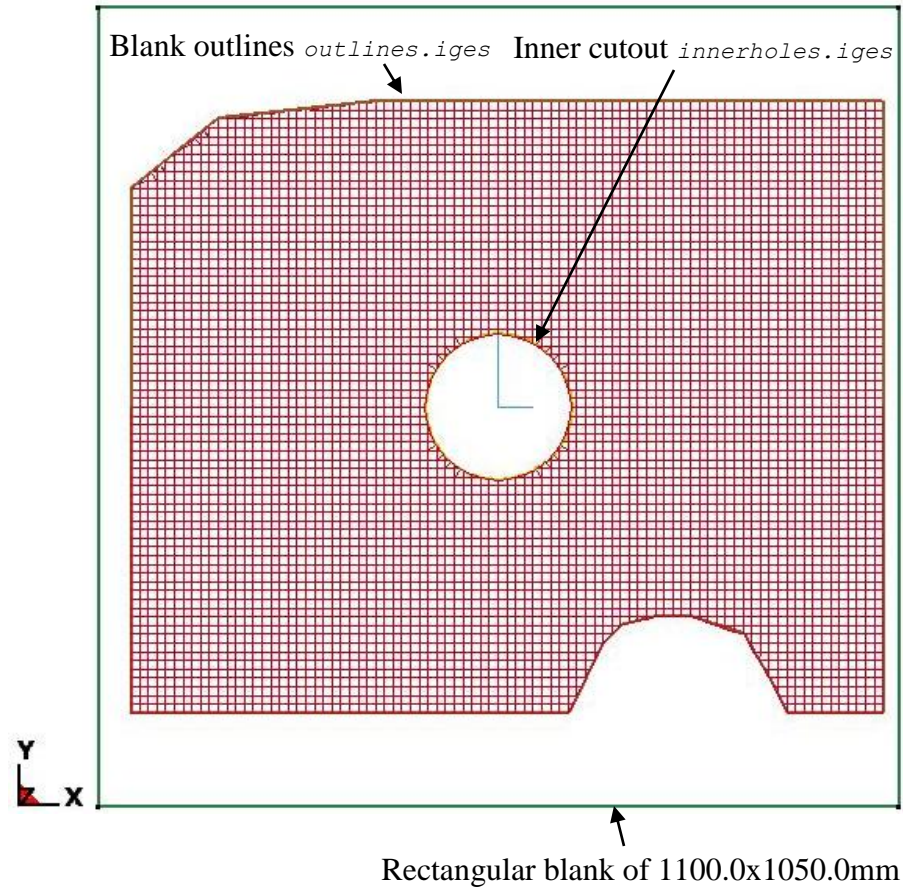
<u>VARIABLE</u>	<u>DESCRIPTION</u>
NPLANE	Plane in which a flat blank to be generated, in reference to the coordinate system defined (CID): EQ.0 or 1: XY-plane (default) EQ.2: XZ-plane EQ.3: YZ-plane
CID	ID of the local coordinate system, defined by *DEFINE_COORDINATE_SYSTEM. Default is 0 representing global coordinate system.
PIDBK	Part ID of the blank, as defined by *PART.
NID	Starting node ID of the blank to be generated.
EID	Starting element ID of the blank to be generated.
XCENT	X-coordinate of the center of the blank.
YCENT	Y-coordinate of the center of the blank.
ZCENT	Z-coordinate of the center of the blank.
XSHIFT	Blank shifting distance in X-axis in coordinate system defined (CID).
YSHIFT	Blank shifting distance in Y-axis in coordinate system defined (CID).

**Remarks:**

1. A rectangular blank is defined, which can be trimmed with IGES curves to a desired periphery and inner cutouts. This keyword is used in conjunction with keyword \*ELEMENT\_BLANKING. The blank outlines and inner holes can be defined using keyword \*DEFINE\_CURVE\_TRIM\_NEW.
2. A partial keyword example of generating a flat blank with PID 1 is provided below. In this example, the blank mesh is to be generated in XY plane in a global coordinate system, with an average element edge length of 12 mm and a blank dimension of 1100.0 x 1050.0 mm, with node and element ID starting at 8000, and with the center of the blank in the global origin. The blank is to be trimmed out with an inner cut-out hole, given by the IGES file *innerholes.iges*. Blank outer line is defined with an IGES file *outerlines.iges*. Both IGES files are used to trim the rectangular blank using keyword \*DEFINE\_CURVE\_TRIM\_NEW, where the variable TFLG is used to indicate whether it is an inside or outside trim. The blank generated for example is shown in the figure below.

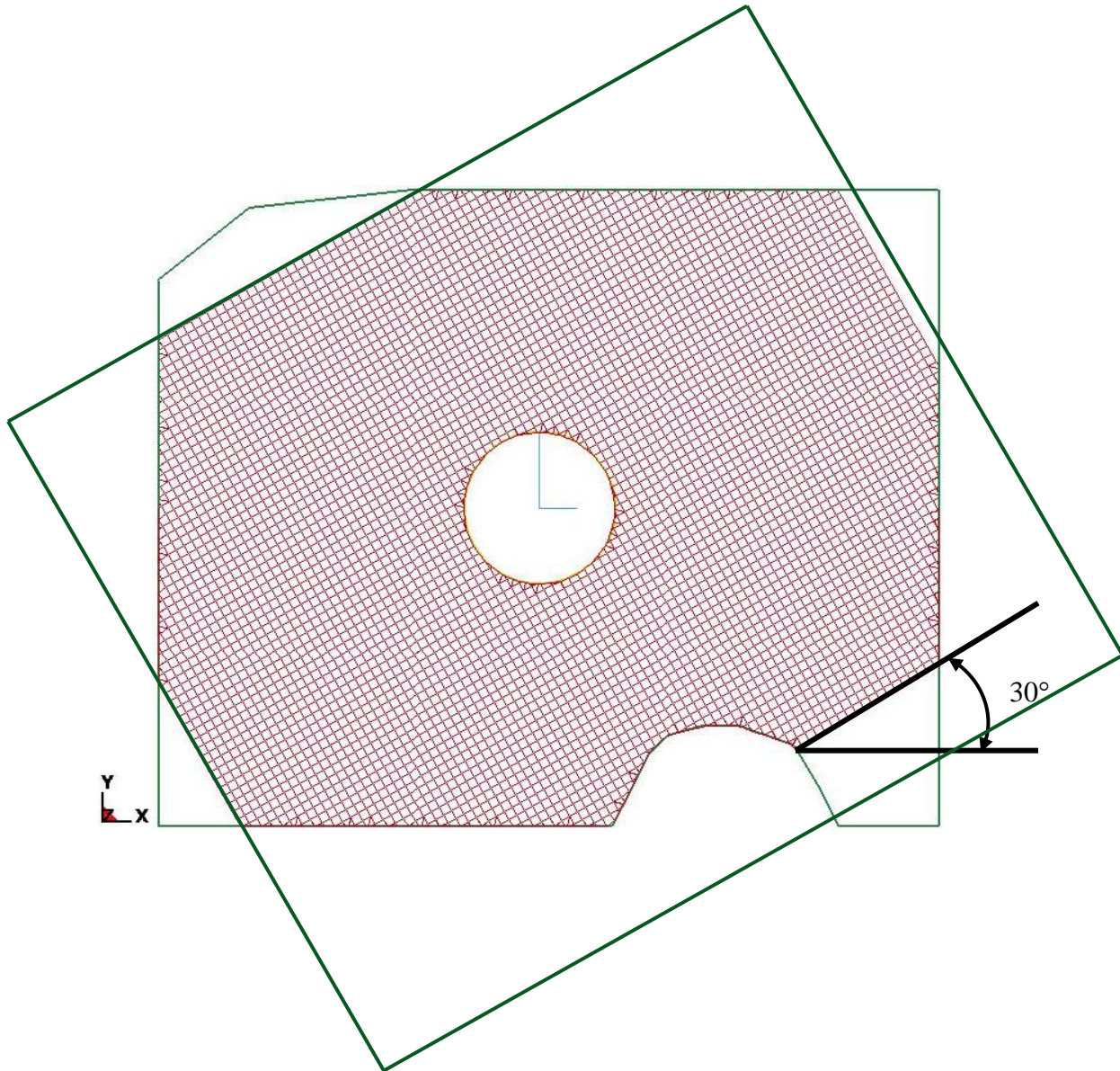
**\*DEFINE\_FORMING\_BLANKMESH****\*DEFINE**

```
*KEYWORD
$---+---1---+---2---+---3---+---4---+---5---+---6---+---7---+---8
*CONTROL_TERMINATION
$#  endtim
    0.000
*CONTROL_FORMING_BLANKMESH
$   IDMSH      ELENG      XLENG      YLENG      ANGLEX      NPLANE      CID
    3         12.00     1100.00    895.0      0.0         0          0
$   PIDBK      NID        EID        XCENT      YCENT      ZCENT      XSHIFT      YSHIFT
    1         8000      8000
*ELEMENT_BLANKING
$#   psid
    1
*DEFINE_CURVE_TRIM_NEW
$#   tcid      tctype      TFLG      TDIR      TCTOL      TOLN      NSEED1      NSEED2
    1111       2          1         0      0.250000    1.000000
innerholes.iges
*DEFINE_CURVE_TRIM_NEW
$#   tcid      tctype      TFLG      TDIR      TCTOL      TOLN      NSEED1      NSEED2
    1112       2         -1         0      0.250000    1.000000
outerlines.iges
*CONTROL_SHELL
.....
*CONTROL_SOLUTION
.....
*DATABASE_BINARY_D3PLOT
.....
*DATABASE_EXTENT_BINARY
.....
*SET_PART_list
1
1
*PART
Blank
$#   pid      secid      mid
    1         1         1
*SECTION_SHELL
$#   secid     elform      shrf      nip      propt      qr/irid      icomp      setyp
    1         16     0.833000      7         1         0         0         0
$#   t1        t2        t3        t4        nloc      marea      idof      edgset
    1.500000  1.500000  1.500000  1.500000  0.000     0.000     0.000     0
*MAT_037
$#   mid      ro        e        pr      sigy      etan      r        hlcid
    1 7.9000E-9 2.0700E+5 0.300000 253.25900 0.000     1.408000 90903
*DEFINE_CURVE
    90903
0.0 253.2590027
.....
    0.9898300      616.7999878
*INTERFACE_SPRINGBACK_LSDYNA
$#   psid      nshv
    1         1000
*END
```



*Using an IGES outline and an inner cutout curve to create a blank with any arbitrary shape*

3. The blank and mesh orientation can be rotated about Z-axis defined. Following the right hand rule, the blank in this case is rotated about Z-axis for a positive 30°, as shown in the picture below, with the angle of 0° aligned with X-axis.



*Set ANGLEX=30.0 to rotate both the blank and mesh orientation by 30°*

4. Inner hole and outer periphery can also be trimmed using the NSEEDs variables in keyword `*DEFINE_CURVE_TRIM_NEW`.
5. This feature is available in LS-DYNA R5 Revision 59165 or later releases. The keyword name change from `*CONTROL...` to `*DEFINE...` starts in R6 Revision 69074 and later releases. For NPLANE in global coordinate system, use R6 Revision 69128 and later releases.

**\*DEFINE**

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