

MET 237 COMPUTER NUMERICAL CONTROL

Eng. Ali Almandeel
 Spring 2010
 Programming Hole Operations [Milling]

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- Fixed Cycles.

In fixed cycles the programmer only needs to specify the coordinates of the hole center and type of machine motions to be performed at the center.

A fixed cycle is programmed by entering in one block containing the following:

- The fixed cycle G code.
- The X & Y coordinates of the hole center.
- The final Z-axis depth.
- The Z-axis clearance plane (R).
- The feedrate F into the hole.

Fixed cycles reduces the programming time and length of program required.

Fixed cycles are modal. A cycle is canceled by a G80 code or replaced by another fixed cycle.

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- **Drill, Center Drill, or Ream Cycle (G81).**

Drill, Center Drill, or Ream Cycle

A G81 cycle causes the machine to ① rapid the tool from the $Z_{initial}$ position to the R_{plane}

② drill the hole to a depth Z_n at feedrate F_n , ③ rapid back to either the R_{plane} or the $Z_{initial}$ position,

④ rapid to the center of the next hole if the $X_n Y_n$ coordinates of that hole are programmed in the next block.

G81 Xn Yn Zn Rn Fn

G81 Specifies simple drilling

Xn Yn Numeric values of n specify the absolute X and Y coordinates of the hole center. Coordinates can be absolute (G90) or incremental (G91).

Zn Numeric value of n specifies the depth of the drill in absolute (G90) or the distance below the R_{plane} to the hole bottom in incremental (G91) code.

Rn Numeric value of n specifies the distance to the R_{plane} in absolute (G90) or the distance below the initial tool position to the R_{plane} in incremental (G91) code. If not programmed, the last active R_{plane} is used, and if none is specified, the tool returns to the $Z_{initial}$ position.

Fn Numeric value of n specifies the feedrate of the tool [(in/min) or (mm/min)] into the hole. If not programmed, the system will use the last programmed feedrate.

Figure 6 Drill, Center Drill or Ream Cycle.

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- **Example of Drill Cycle (G81).**

[Drill cycle in absolute mode and feedrate of 7 ipm](#)

N01 G90

N02 G81 X2 Y3 Z-.25 R.1 F7

[Drill cycle in incremental mode and feedrate of 7 ipm](#)

N01 G91

N02 G81 X.75 Y.5 Z-.35 R-1 F7

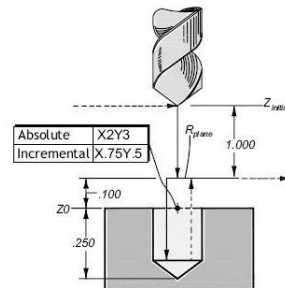


Figure 6-1 Drill cycle.

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