

## PRECIX ADVANCED CUTTING TECHNOLOGIES

### NESTING

This is a classic problem of finding the most efficient layout for cutting n parts out of a given sheet size with minimum waste and/or maximum contiguous unused sheet area.

- sheets are rectangular and no larger than 6'x12'
- elements are no smaller than 1" x 1"
- the size of the cutting tool must be added to the element size plus a buffer
- element datasets will be real numbers (xxx.xxx")
- Ideally, processing time will be related to efficiency (i.e. running the process for 1 hour will find a better solution than 2 minutes). Running the process for long periods is acceptable as the sheet layout may be used several hundred times
- process will run on a pentium III class machine running at 500 Mhz or better under QNX realtime os

Elements would consist of a series of xy moves which form a non rectilinear outline (there may be additional moves which describe an element within the element such as a small circle cut out of a larger circle). These xy moves won't necessarily be continuous and may contain non-cutting "jog" moves. I would propose forming a rectilinear outline at the boundary of the elements and using this for the nesting.

Optionally, it would be interesting to have the sheet to be cut rectilinear, but not necessarily rectangular, in shape. We currently have image sensors for locating cross hairs on sheets to be cut with tangential knives. We envision using the same image sensor to "scan" a sheet which has been cut, identifying all unused areas. The sheet would be uniquely identified then stored. Our controller will maintain a database of these sheets (and their corresponding unused areas) using the information for future cutting jobs.

### PROBLEM DATA SET

I will be able to custom design a data set which demonstrates the various limits of these problems. I may also be able to provide a small utility which displays the data sets (including data that you may update) if you feel it would be of use to the group.