1.0 History.

Historically there has been demand for common cutting. It seems obvious when cutting and nesting parts with straight sides, especially large numbers of rectangles. However it is a balance and the savings in scrap and cutting time have traditionally been more than offset by additional costs and losses. In a mixed nest of rectangles and shapes, it is less of an obvious gain to common cut where necessary. Common cutting means fixing the cut width or kerf, something which is not always possible. It therefore has a real problem in implementation in more than a few cases. However there are compromises.

1.1 Common cutting in FastCAM.

This was introduced into the FastCAM as common cut pairs, identical pairs cut back to back in a figure 8 pattern. This increased cutting efficiency and removed a pierce from the nest. Pierces on oxy are the greatest time waster and on plasma, a great cost in consumables and so are to be avoided. Common cut pairs gave the best balance.

There have been many systems for general common cutting. The one of greatest interest has been where the part separation in nesting is exactly one cut width. This raises the possibility of many common cuts in a nest of largely rectilinear parts.

As with all cutting, the concerns are

- Part movement
- Part marking during cutting
- Part dimensional accuracy
- Cutting time
- Piercing time
- Scrap

These can work against each other. A previous system which used the common cut but pierced to every difficult location was not adopted as the number of pierces increased dramatically. There was often a negative saving. There was a saving in scrap and cutting time but at the cost of massive increases in piercing time wasted. There was a saving in plate, but by cutting both CCW and CW, for plasma a loss in part dimensional accuracy. With the restraint of the skeleton, there could also be a further loss.

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Comparing with traditional nesting of separate parts each with their own external entry and exit, the FastCAM Common Cut Nest has the following balance:

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<td>Part movement</td>
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<td>Part marking during cutting</td>
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<td>Part dimensional accuracy</td>
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<tr>
<td>Cutting time</td>
<td>+</td>
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<tr>
<td>Piercing time</td>
<td>+</td>
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<td>Scrap</td>
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However by often eliminating piercing time and halving cutting time, the gains can be as high as 11x the productivity and less scrap at the cost of lower quality parts.

2.1 Common Cut Nest operation.

In the current FastCAM Professional system, we have introduced the idea of a completely common cut nest. You have to set the part spacing to exactly the cut width before nesting.
Step 1. This screen has a default setting of standard. Set the common cut mode.

This is selected in the box Common Cut Nest.

Note that the button COMMON CUTTING appears on the button tool bar on the right hand side. This signifies that all parts will be kerf offset on output and such common straight entities as exist will be cut only once.

Step 2.
Set the Part to Part separation = the cut width (2* the kerf Radius). If the kerf radius is already known, this will be done automatically. Conversely, if you set the part to part distance to 4mm as above, the kerf radius will be set to 2mm.

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Step 3.

Set your entry and exit defaults in FastPATH. It is important to remember that the first part cut will have a traditional entry. Any part which is not common cut will also need such an entry. You must also set the entry and exit parameters for parts which have internal cutouts.
Step 4
Add your parts.

Step 5.
Press the red NC button as above and you will be asked to verify the NC output in FastPLOT.
In this nest there is one pierce shown as a “+”. Other ‘edge starts’ are sometimes shown as “0”. These are much faster. If the NC control does not have a separate EdgeStart command, the operator will be required to cut short the pierce cycle, especially on oxy. Pierces on the part edge are to be avoided.

If you zoom to the first entry, you can see both the entry and the subsequent edge start for part #2.
In this picture you can see

1. the desired entry
2. the 2mm gap for the edge start of part #2.

In addition, the nest demonstrates 4,3,2 sides parts. In some nests you will get parts where only a single side has to be cut. In addition, FastNEST will locate overlaps which are only partial and the machine will be directed to cut out missing sections.
3.0 Summary

As indicated, there are advantages and disadvantages in using this technology. This function is included in FastCAM v5.10 Professional Edition however it does require the updating of the key file to augment the software lock.

Please be aware that the edge start cutting can mark the part. Breaking the skeleton can allow more movement than usual. Restarting and certainly piercing on the cut edge can damage the edge. However the efficiencies are remarkable with a 10x gain in productivity for the cutting of rectangular shapes. In a world where labour is far cheaper than material, this is a worthwhile technology which can dramatically increase efficiencies and productivity.

- end -

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