JavaScript based Slicing

composed by Rene K. Mueller, contributing authors: Triffid Hunter
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Here some notes for JS Slicing; the fact you found this document means the link was shared with you, feel free to add your notes and thoughts, in this case properly attribute your input with your fullname.

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References

- https://github.com/triffid/WebSkein
- http://triffid-hunter.no-ip.info/webskein/webskein2.html, actual working example of WebSkein
- Computing Straight Skeletons and Motorcycle Graphs: Theory and Practice (Thesis) by Stefan Huber (link no longer works)
- Computing Straight Skeletons and Motorcycle Graphs: Theory and Practice (Slides) by Stefan Huber (copy on G+ drive)

Challenges of Slicing

by Triffid Hunter (2013/03/16) on irc #reprap:

The heart of a slicer is the polygon offset routine, without a robust one it's useless.. you'd be surprised how many slic3r bugs are caused directly by the imperfect polygon offset routine it uses.

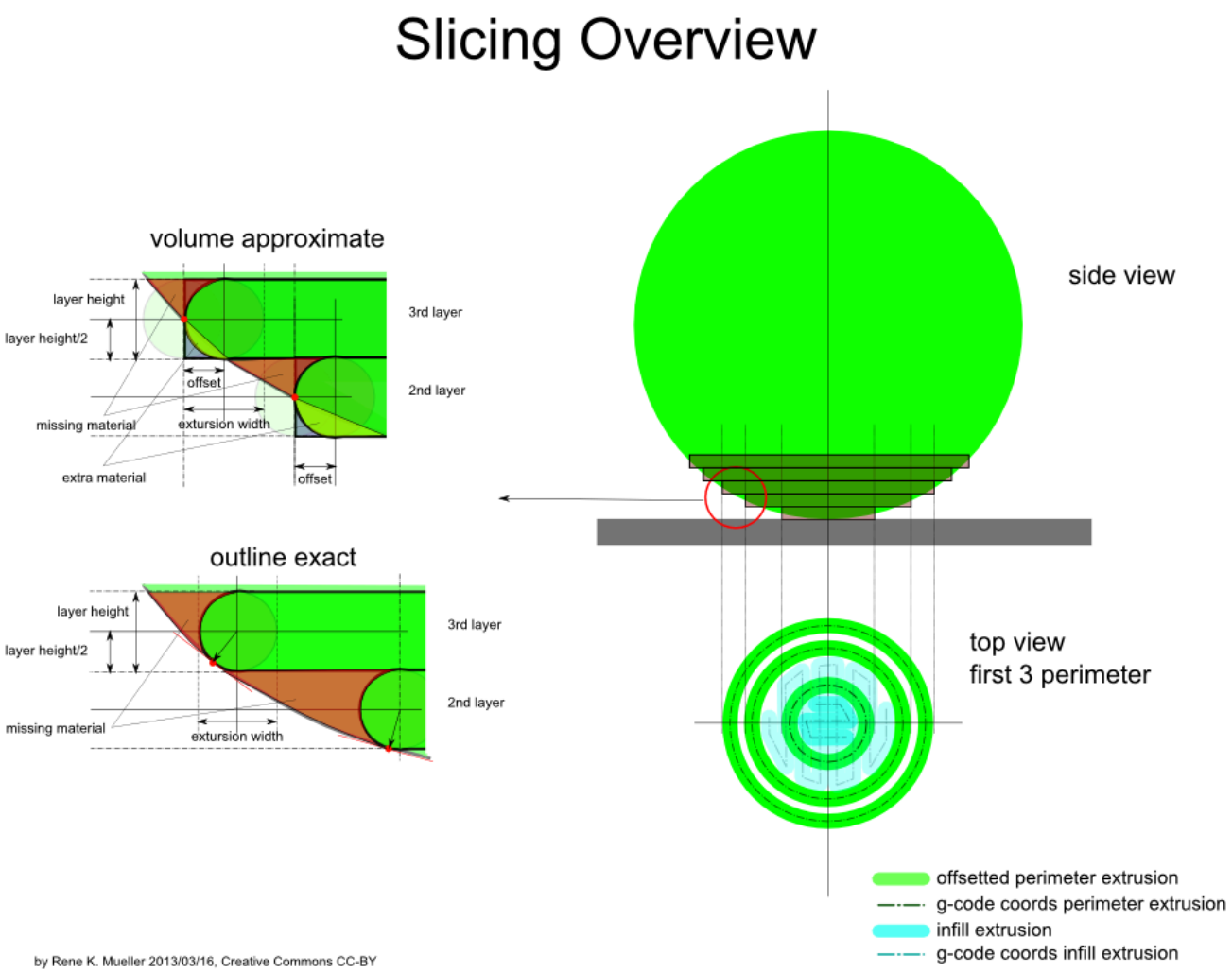
1. the object must be sliced into layer outlines. this is parallelisable.
2. the outlines must be vertically combined to find regions of support candidates, bridges, top/bottom solid areas, etc. this is NOT parallelisable.
3. toolpaths can be drawn in the regions using polygon offset. this is parallelisable

Well let me tell you this, slicing to get layer outlines is trivially simple, but offsetting them is very hard, to draw the perimeter in the right place, it needs to be offset 0.5 extrusion widths inwards from the outline, to draw the next perimeter, it needs to be another 0.9 widths in, then you need to offset another 0.9 or so to get a clipping border for the infill.

The polygon offset is so hard that I'm tempted to use a rasterised approach rather than deal with trying to do it geometrically; seriously, it takes a system approaching the complexity of the human visual cortex for that particular operation to be simple.

Illustrations

by Rene K. Mueller (2013/03/16) to explain the details of slicing approaches:



Slicing Details: Offsetting