446.326A CAD/CAM

NC Manufacturing Functions II and RP software

November 02, 2009

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Contents

- CATIA V5 - NC Manufacturing Function
  - Surface machining: Roughing and finishing

- RP software
  - Quicklice™, Stratasys

CATIA V5

NC Manufacturing Functions II

Lecture Materials

- Download from the class web page
  - “CATIA NC Setting_Surface.pdf”
  - “CADCAM_Part2.igs”

Surface machining

- Roughing
  - Video demo

- Finishing
  - Video demo

Rapid Prototyping

QuickSliceV64

Lecture Materials

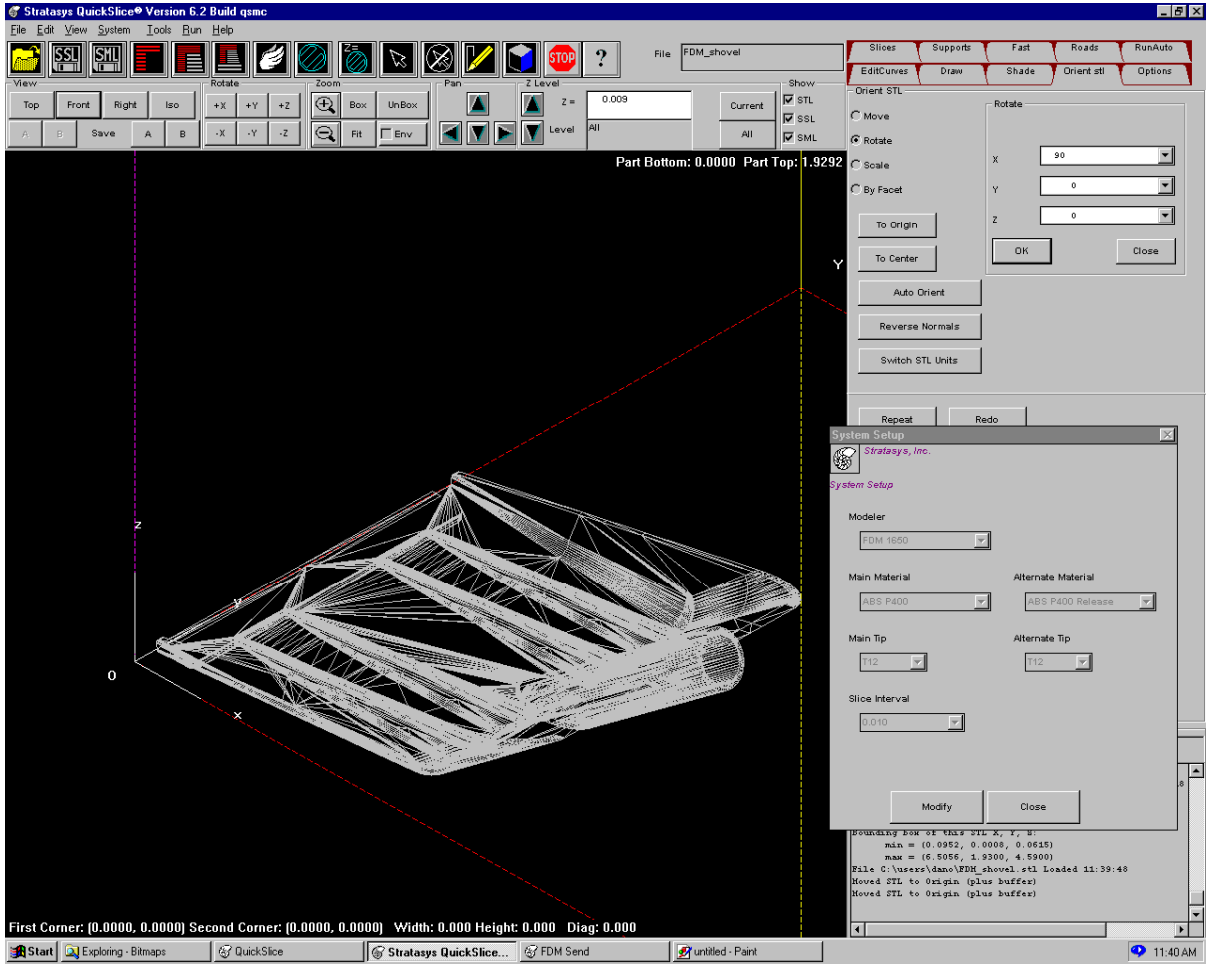
- Download from the class web page
  - “QuickSliceV64-qsni.zip”
- Extract in a local c drive
  - C:₩QuickSliceV64-qsni
- Run the software
  - C:₩QuickSliceV64-qsni₩bin₩qs.bat

FDM Software – Three Levels

- **STL file** – Tessellated Stereolithography file – export from solid modeling package
- **SSL file** – Sliced Layer File, Support Calculation – Proper part orientation can drastically affect build time, support requirements, and part strength
- **SML file** – Raster, Build Parameters, time estimation

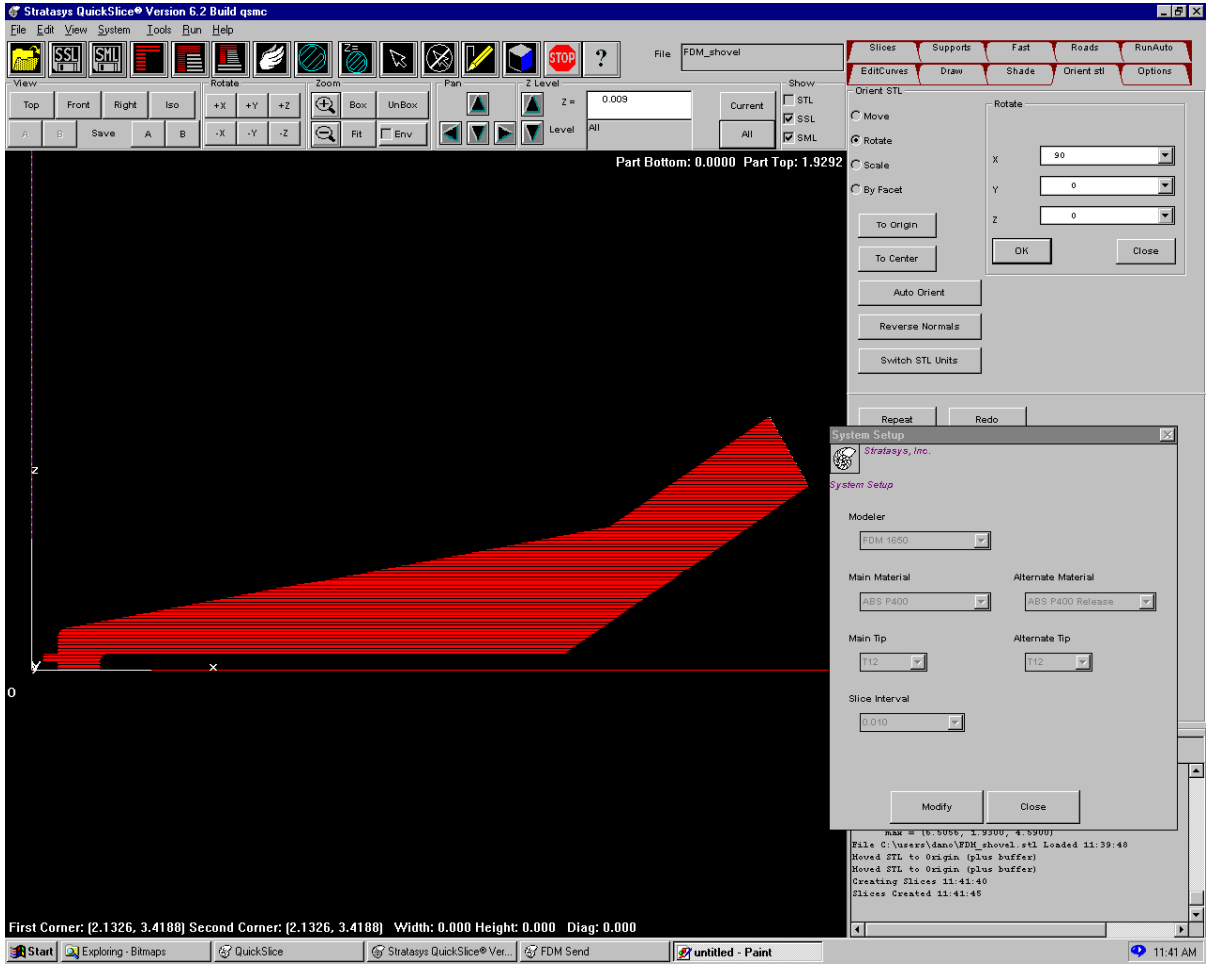
STL File – Collapsible Shovel Head

- Tessellated (Triangulated) format
- Standardized Export Type
- Quickslice Layout



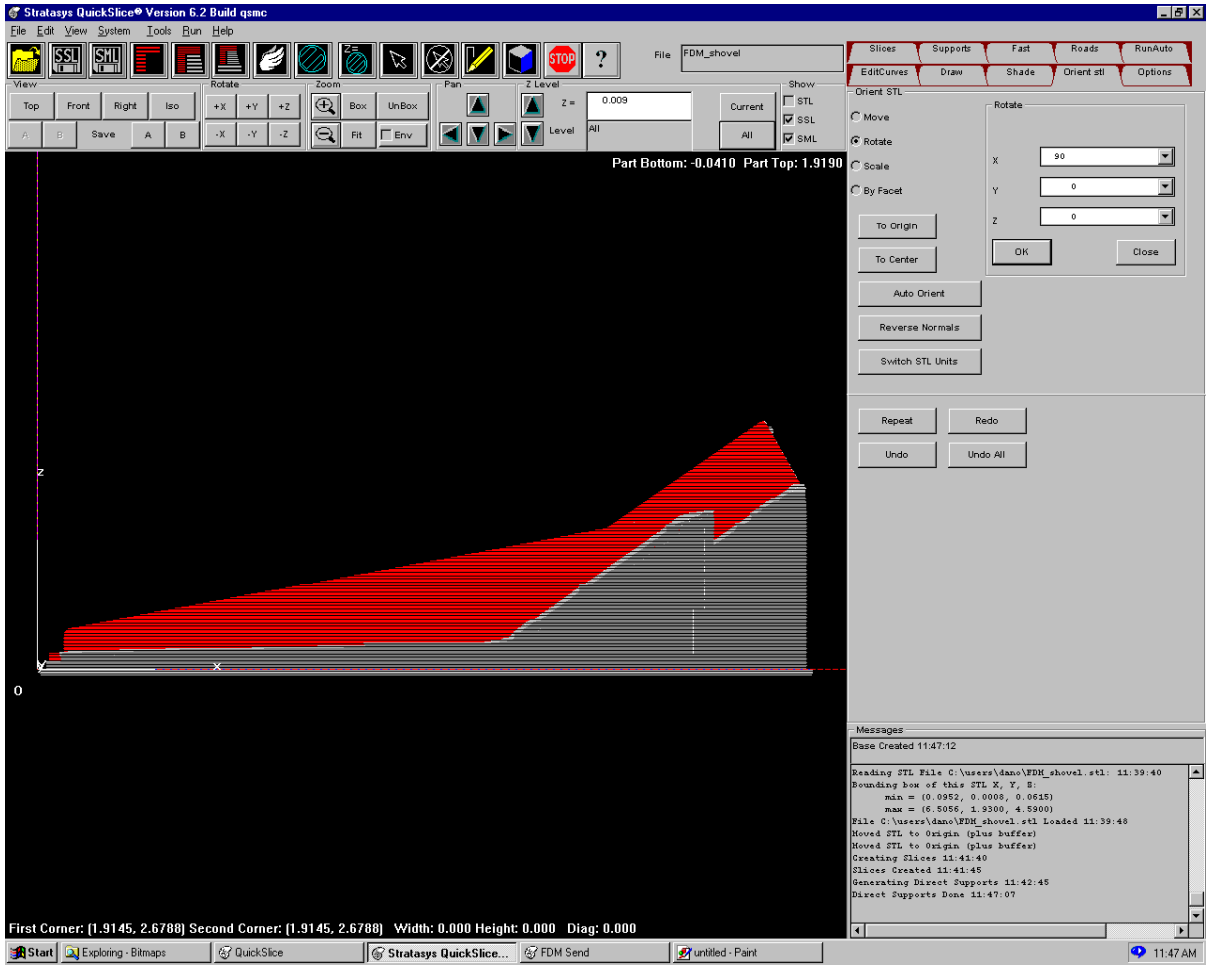
SSL File – Unsupported, Front View

- Vertically Sliced File
- Orientation Important!
- Unsupported Material will fall



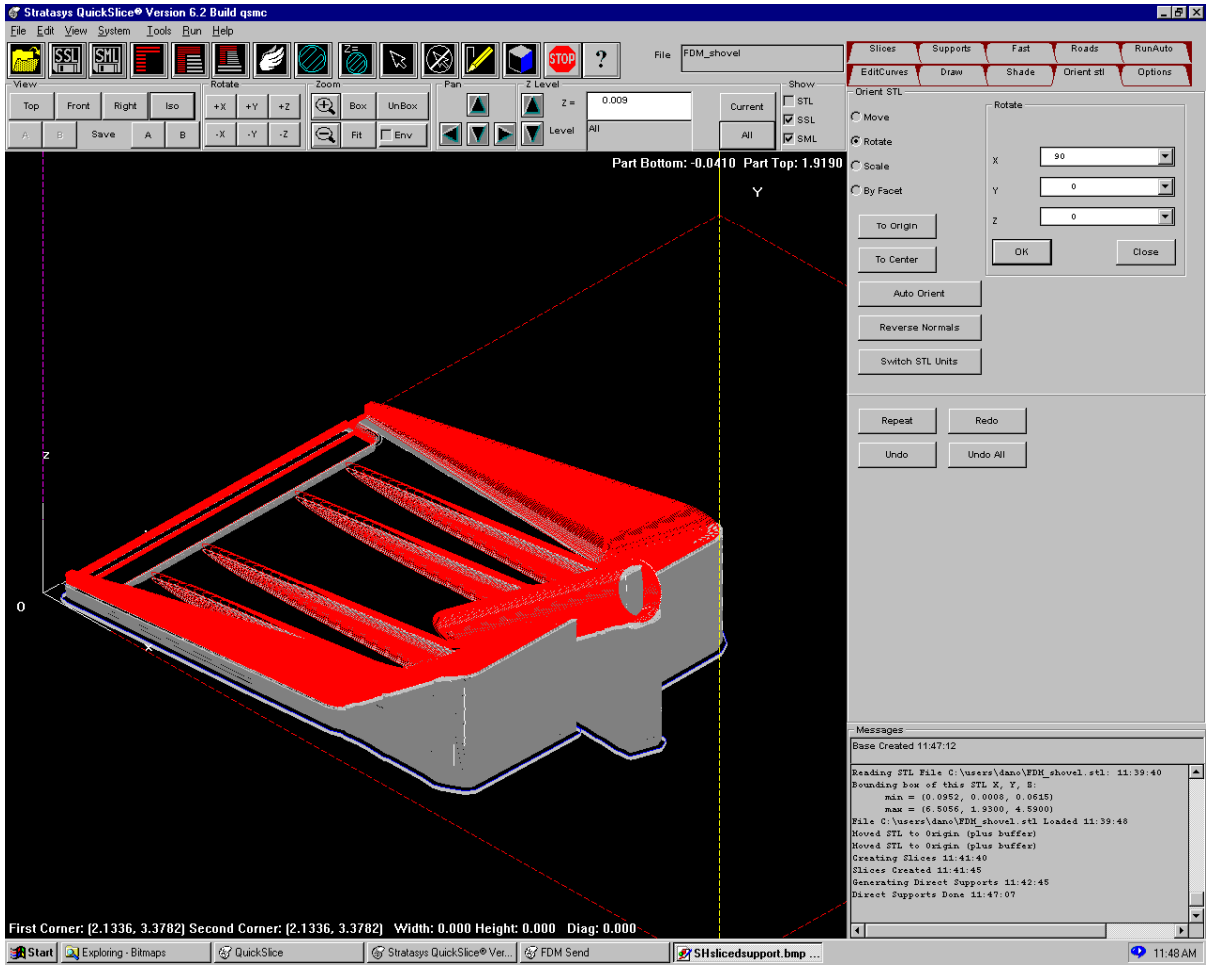
SSL File – Supported, Front View

- Support Calculation
- 45° Support rule
- Foam Substrate
- Foam Irregularities



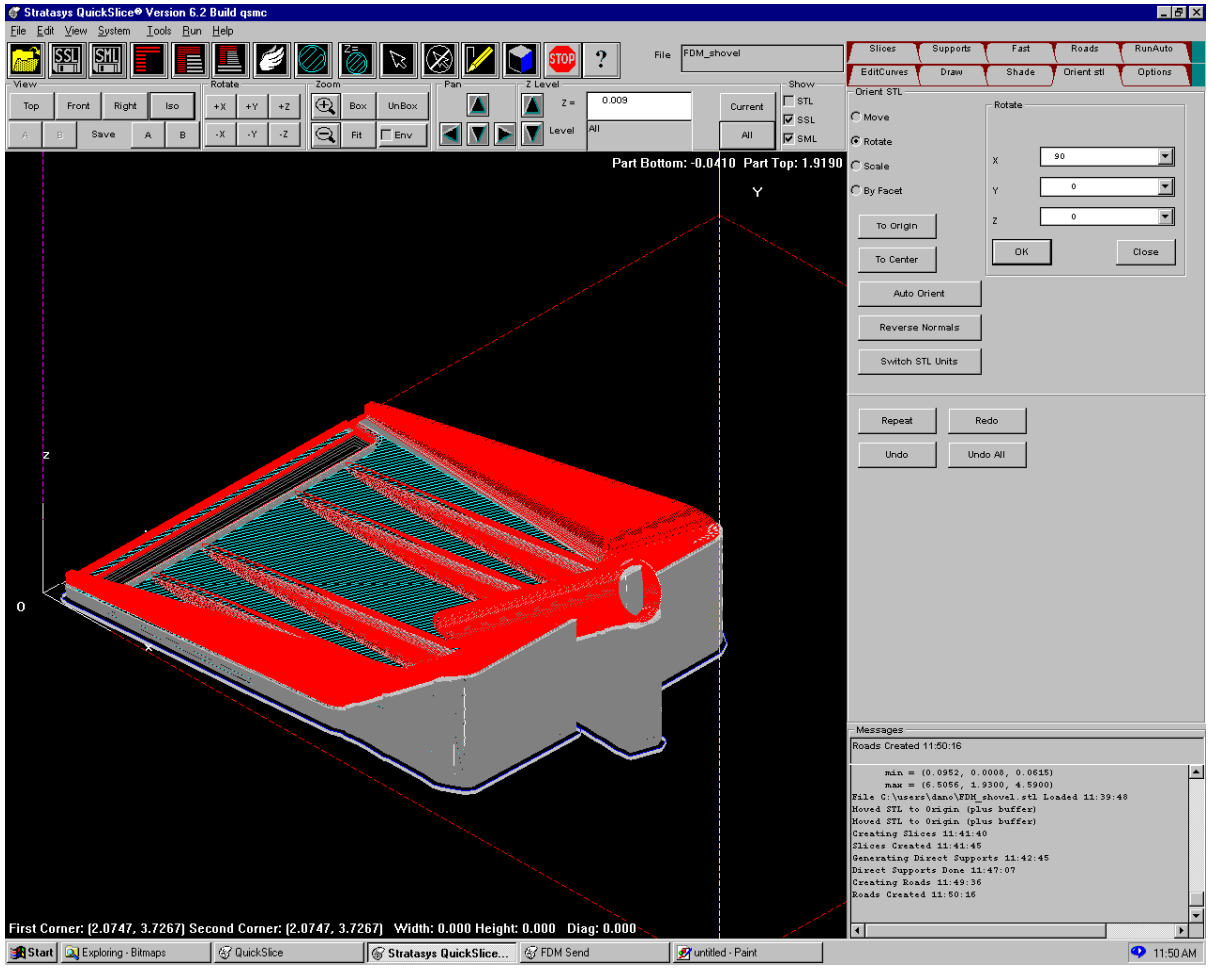
SSL File – Supported, Isometric View

- Support Base (Blue)
- Removing Support Material
- Calculation and Removal can be time intensive



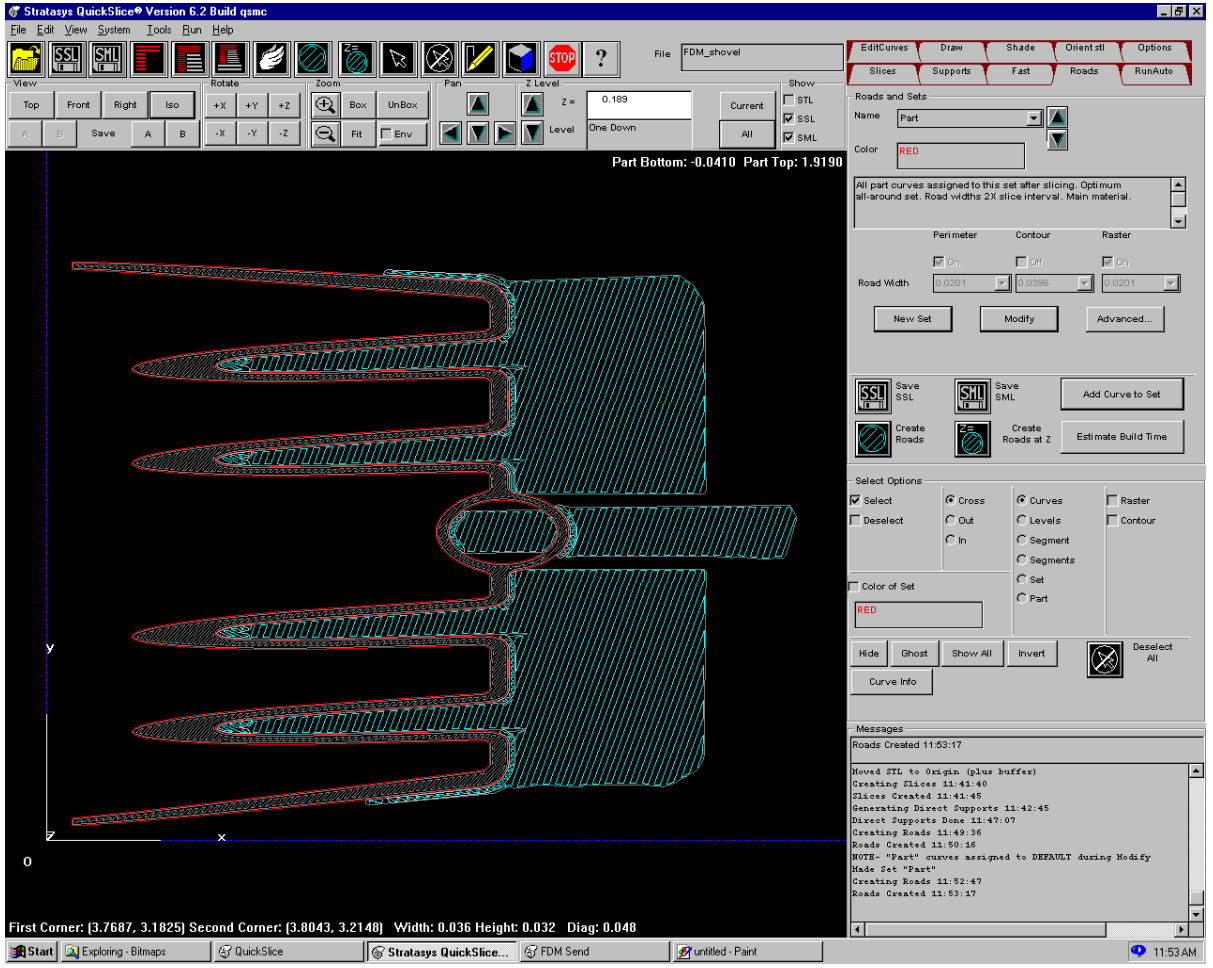
SML File – Supported, Isometric View

- Road Generation
- Colored Layer of SSL file determines road orientation
- Road type and orientation strongly affects build time and part strength



SML File – Supported, Top Layer

- Raster oriented at 45° angle (FDM material behaves like a composite)
- Note loose fill of support material - easier to break and quicker to build



FDM Build Parameters - Software

- Perimeters, Contours, Raster (Road type)
  - Perimeter: Follows outer shape of current slice-ideal for cosmetic outer surface
  - Contour: Follows shape of perimeter on part interior - not commonly used as it leaves gaps
  - Raster: Standard back and forth part fill - adds strength to part, composite theory (raster angles)
- Road width - Dependant on nozzle size and feed rate - ranges from .012 to .0396 for T12 nozzle
- Air Gap - Gap between roads - allows for tightly fused, strong surface, or sparse, quick building fill