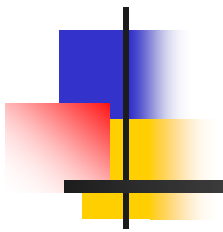


2006-02 CAD/CAM

RP software lab/demo

2006.11.15

Hyung-Jung Kim

Contents

- RP software
  - Quicklice™, Stratasys
- Hardware demo at 1255-1
  - RP, Scaffold
- Design guideline for manufacturing
  - In-Chul Hwang,
    Mechanical Engineering of Manufacturing Process Lab.

Lecture Materials

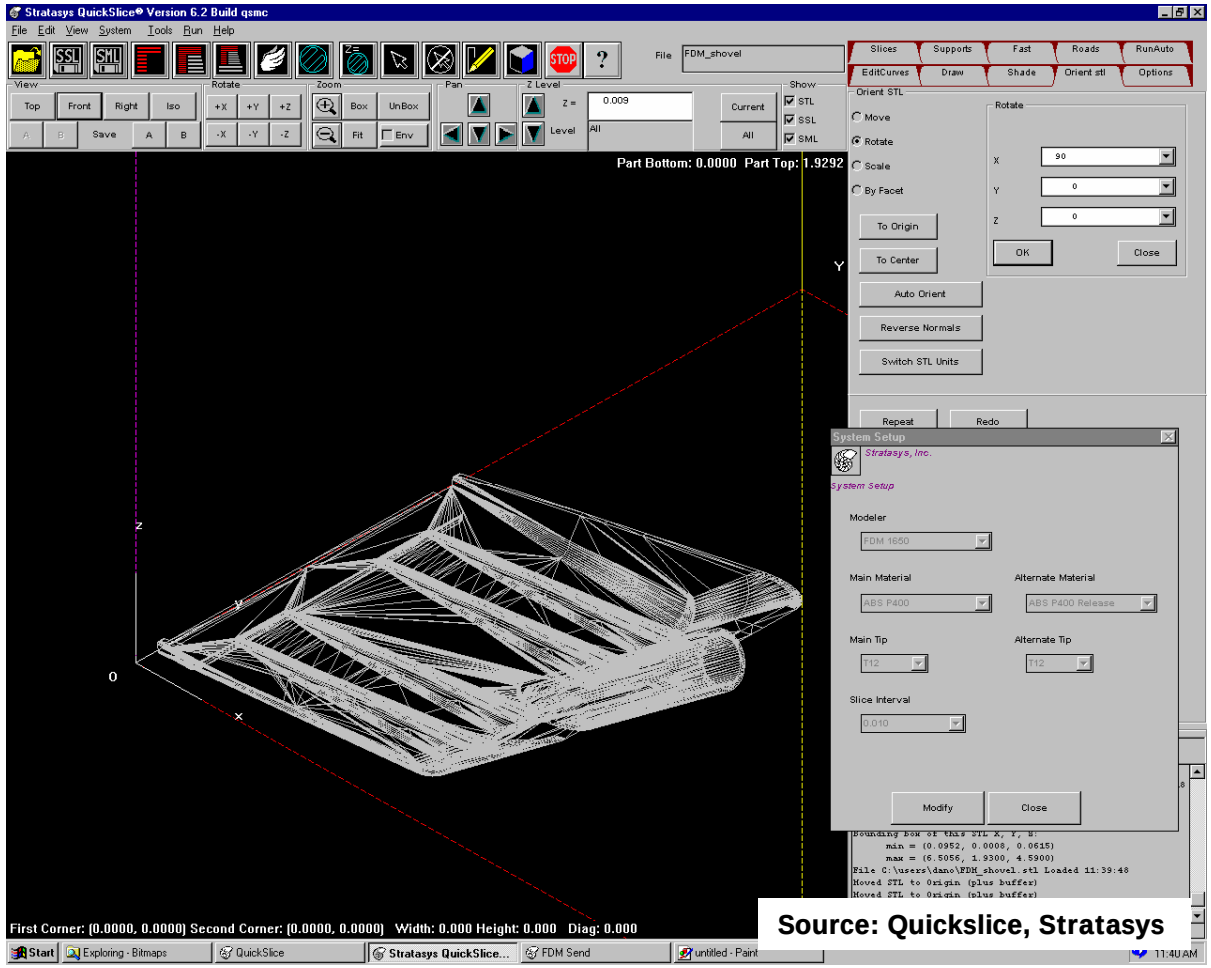
- Log in as
  - Id: CAD, Password: (blank)
- Download from the class web page
  - “QuickSliceV64-qsni.zip”
- Extract in a local c drive
  - C:₩QuickSliceV64-qsni
- Run the software
  - C:₩QuickSliceV64-qsni₩bin₩qs.bat

FDM Software – Three Levels

- **STL file** – Tesselated 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** – Rastors, Build Parameters, time estimation

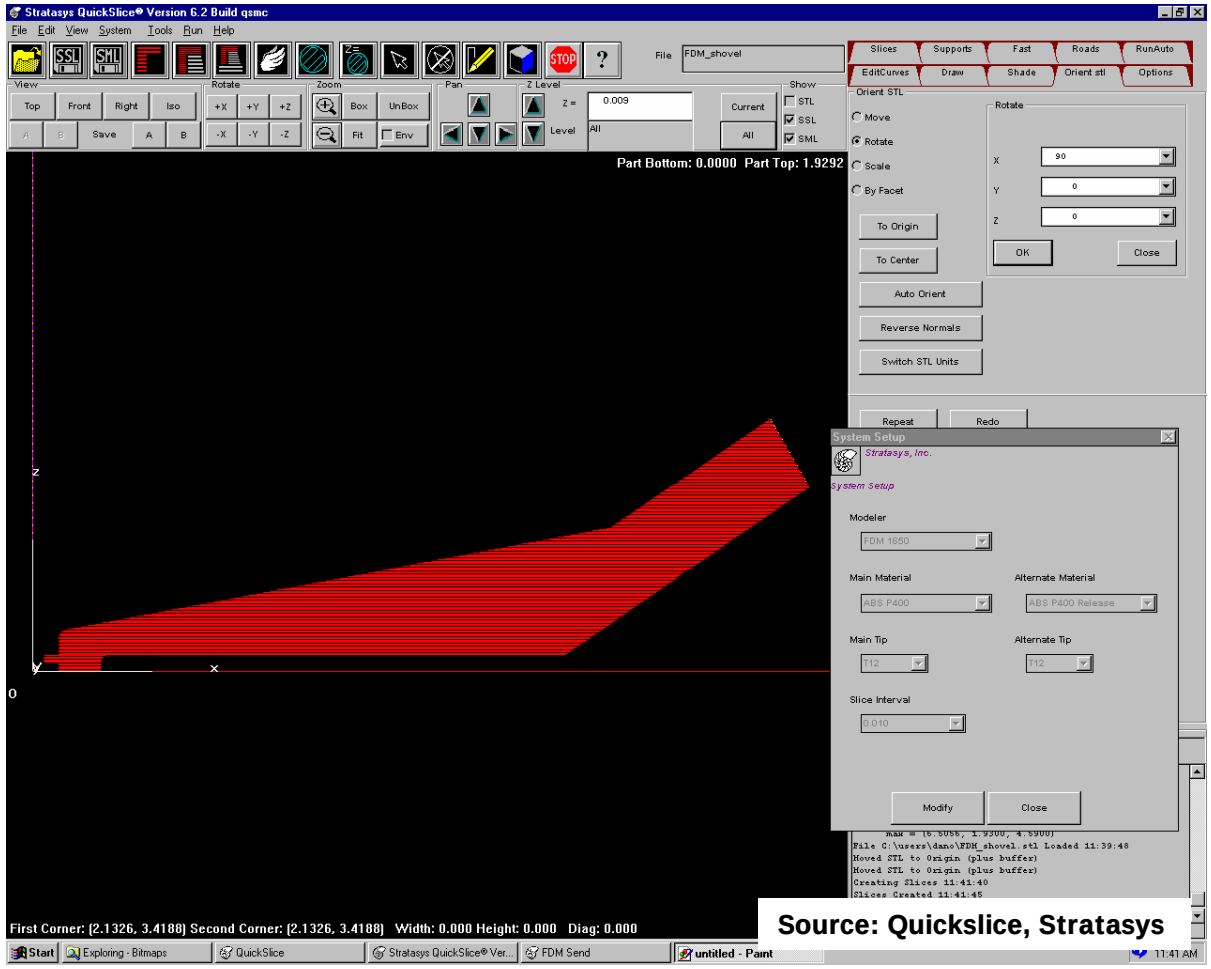
STL File – Collapsible Shovel Head

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



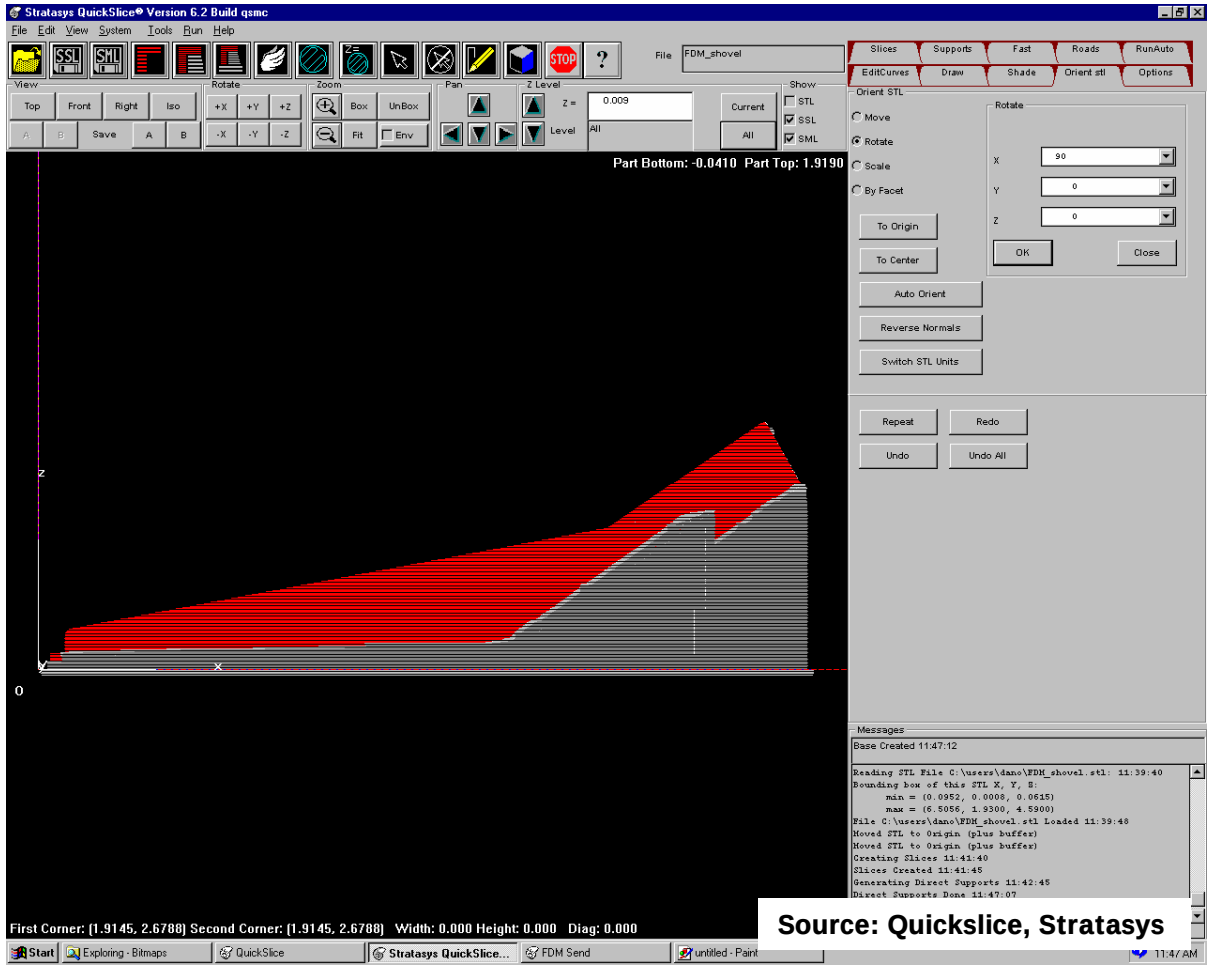
SSL File – Unsupported, Front View

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



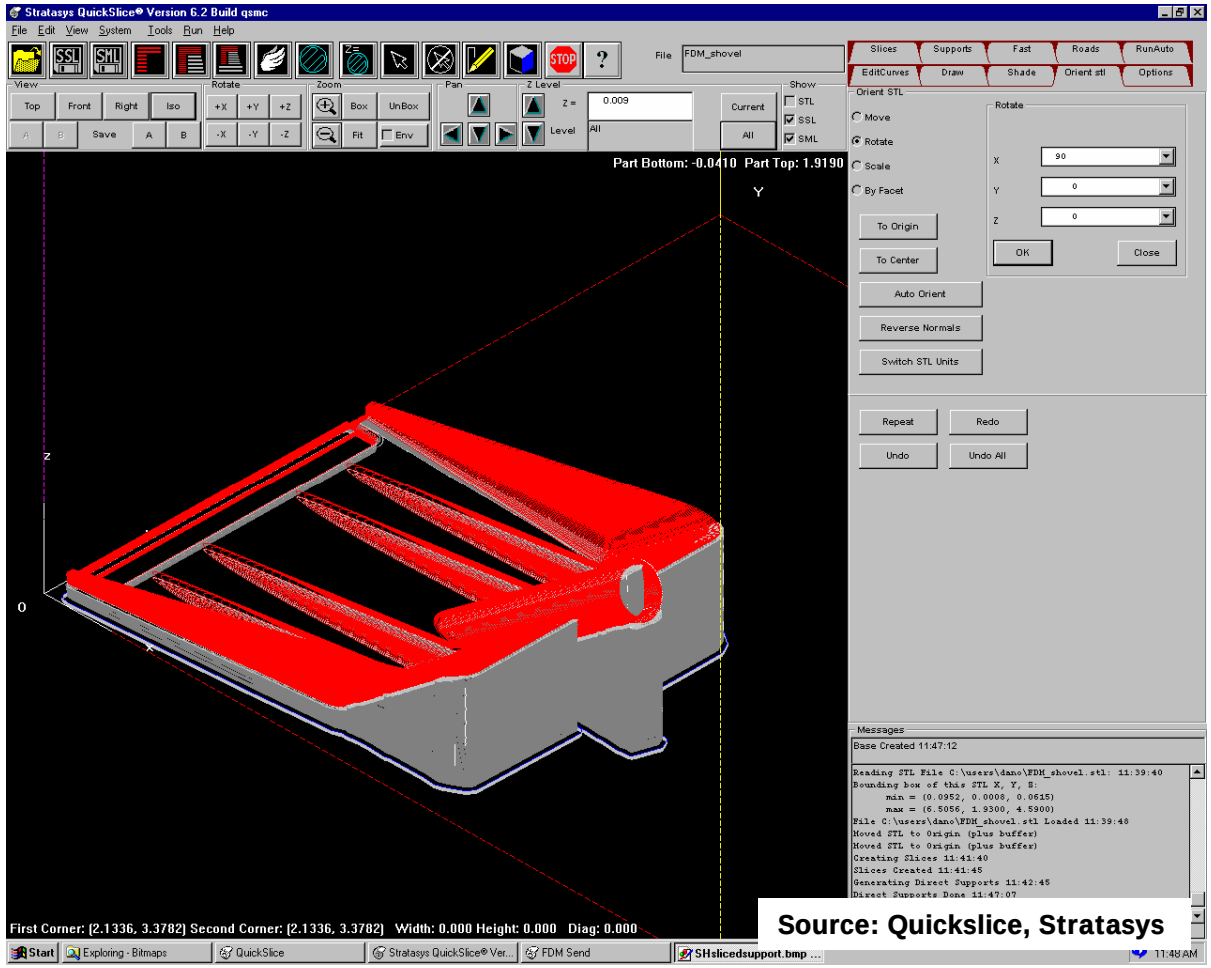
SSL File – Supported, Front View

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



SSL File – Supported, Isometric View

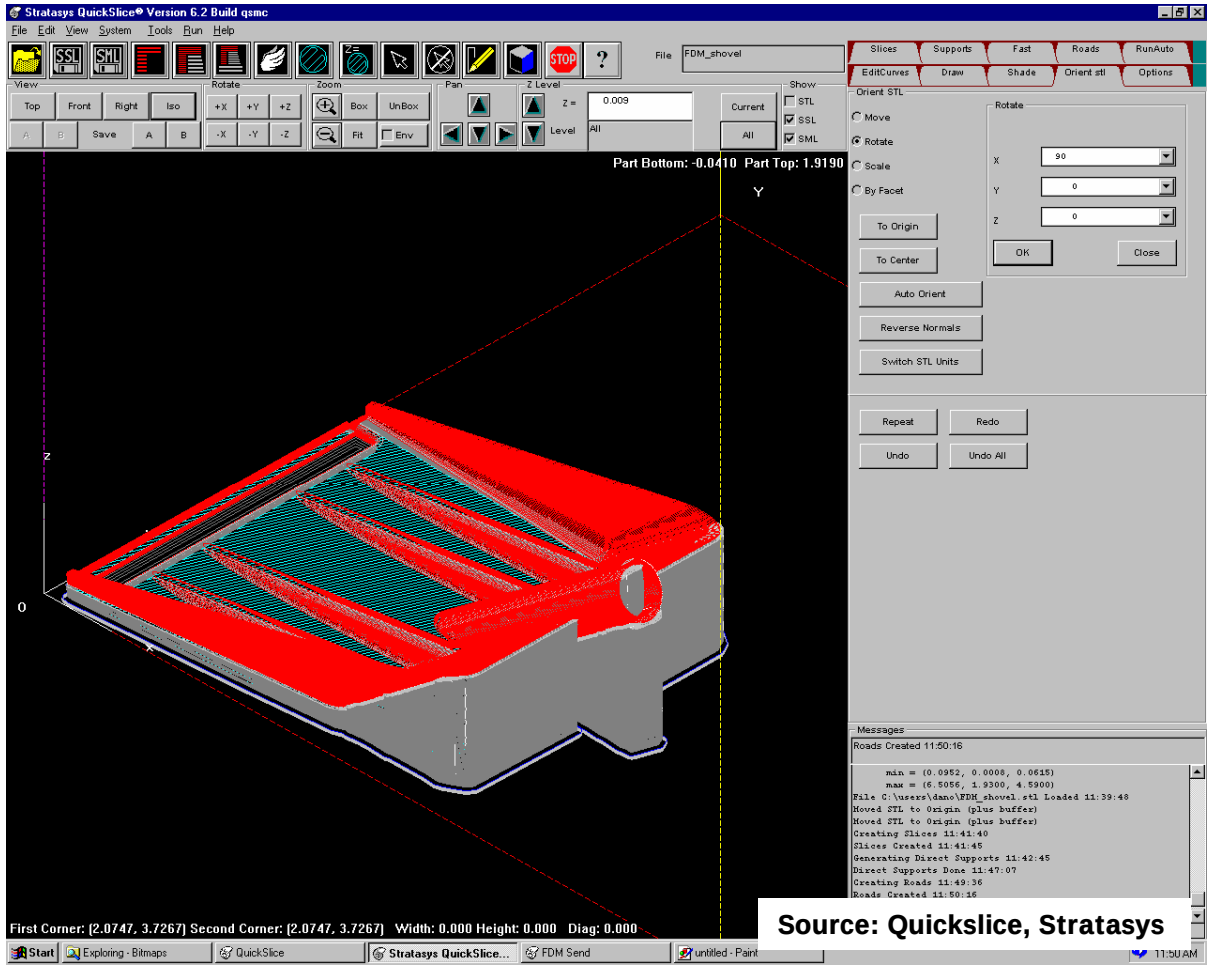
- Support Base (Blue)
- Removing Support Material
- Calculation and Removal can be time intensive



Source: Quickslice, Stratasys

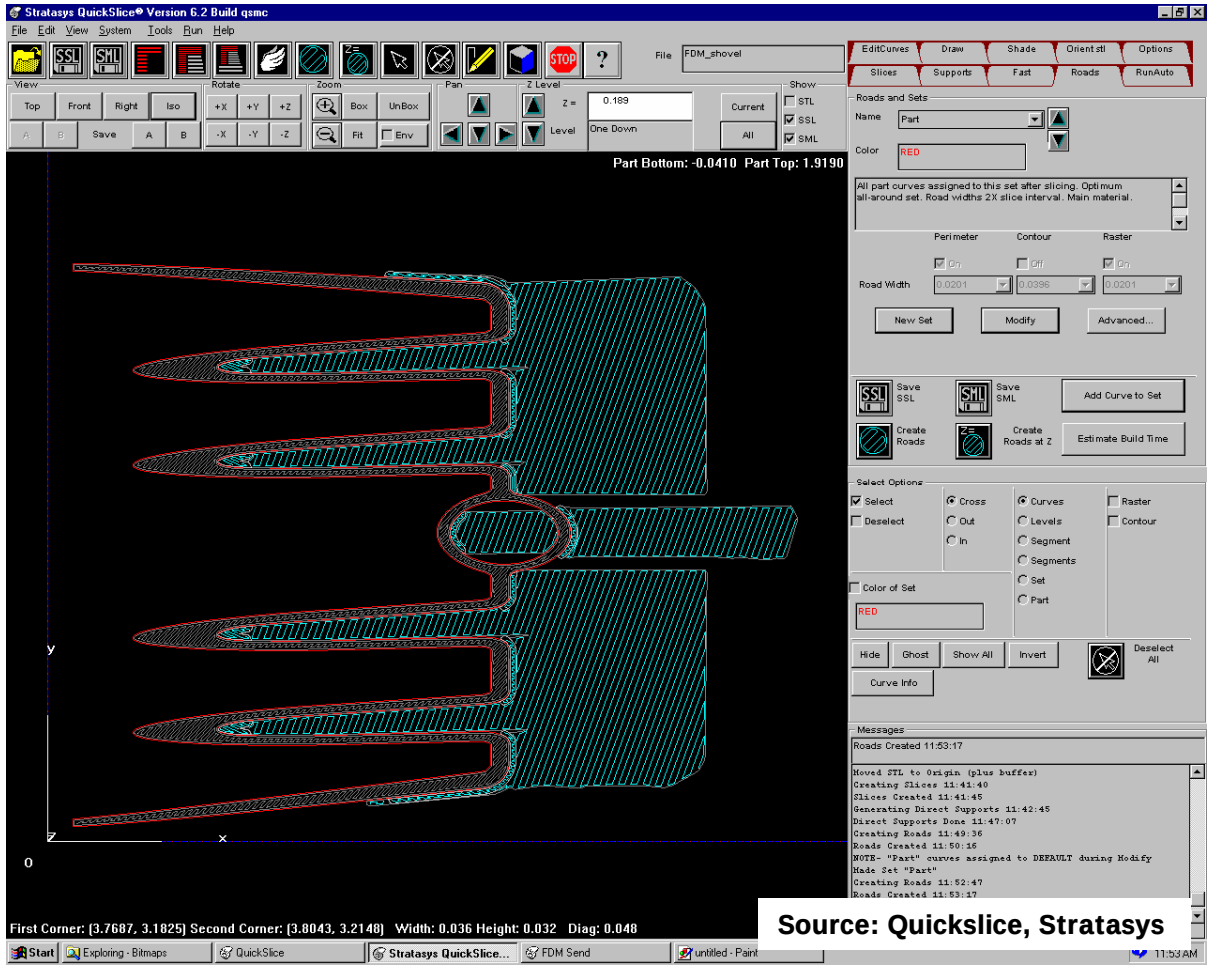
SML File – Supported, Isometric View

- 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

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



Source: Quickslice, Stratasys

FDM Build Parameters - Software

- Perimeters, Contours, Rastors (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
  - Rastors: Standard back and forth part fill – adds strength to part, composite theory (rastor 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