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Innovation in Spray Technologies to Reduce Emissions

Reduce Waste with Spray Technique Training

in painting & coating operations

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March 2007

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Reduce Waste with Spray Technique Training

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Topics to cover today:

- STAR® Program
- Upcoming Auto Body MACT Standards
- New Tools
- Spray Techniques to Reduce Waste

Spray **T**echnique **A**nalysis and **R**esearch

STAR® Training Program

- Developed spray technique training to reduce waste in paint operations
- Equipped and trained 41 STAR schools in 25 states in 10 years
- Development of two new tools:
  - LaserPaint ™ targeting device
  - VirtualPaint ™ virtual reality training system

Upcoming
Auto Body MACT Standard

- Due out for review by June 2007
- Met at RTP EPA office July 24, 2006
- No draft has been available
- Final Rule December 31, 2007
- MACT standard to will cover HAPs (not VOCs)

MACT STANDARD MAY INCLUDE:

- **Painter certification and training**
  - Training on spray technique
  - Written certification
  - No skill certification - so no minimum transfer efficiency
  - No point of sales restrictions
- **Required filtered exhaust from painting area or booth**
  - May or may not require booth
- **Reporting requirement**
  - Certification proof for painters
  - Paint booth maintenance records such as filter change out schedule
  - Certification of compliance
  - Annually or semi-annually

New Tools

- LaserPaint™ targeting device
  www.LASERPAINT.us
- VirtualPaint™ virtual reality paint training system
  www.VirtualPaint.us
- Mobile Outreach for Pollution Prevention (MOPP)

LaserPaint™
Targeting Device

has three major functions:

- Distance Control
- Overlap
- Targeting

LaserPaint™
(shameless sales plug)

- $295.95 www.LaserPaint.us
- Invented at Iowa Waste Reduction Center
- 319-273-8905

LaserPaint™
laser pointer

Always watch your materials first and use your side vision to watch the laser pointer!

www.LaserPaint.us

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VirtualPaint™

Changing the dynamics of traditional hands-on painter training

www.VirtualPaint.us

VirtualPaint™
virtual reality paint training system

- Highly accurate representation of spray patterns & coating accumulation
- Realistic application technique simulation
  - Realistic stand-off distance
  - Spray gun orientation
  - Traverse speed
  - Spray gun triggering
  - Spray pass overlap
- Accumulation mode gives immediate feedback
- Practice time without clean up

www.virtualpaint.us

Spray **T**echnique **A**nalysis and **R**esearch
STAR®

Spray Techniques

1) Spray gun distance to part
2) Perpendicular to surface
3) Spray angle
4) Consistent 50% overlap
5) Banding and edging
6) Reduce lead and lag
7) Spray pattern size & shape
8) Targeting – plan of attack
9) Transfer Efficiency
10) Build Efficiency
11) Practice time

Spray Techniques

Spray gun distance to part

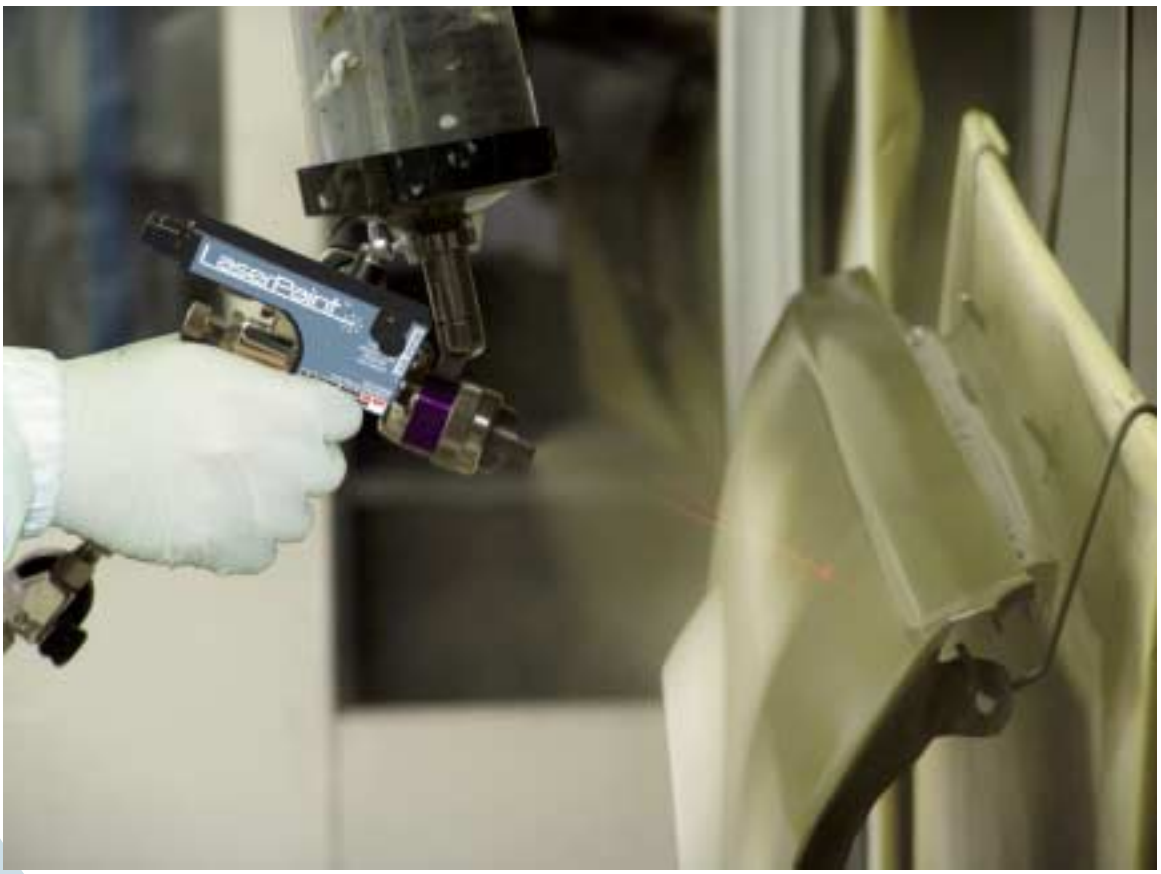
Spray gun distance to part should follow recommendations from paint sheet & gun set up from manufacturer.

- Keep gun distance at optimal distance
- Be consistent – varied distances leads to an inconsistent film build
- HVLP guns 4” to 6” for auto body
- Use a LaserPaint® targeting tool for distance control
- Paint performs best at optimal spray distance

Spray Techniques

Spray gun distance to part

Spray gun distance to part at optimal distance



Spray Techniques

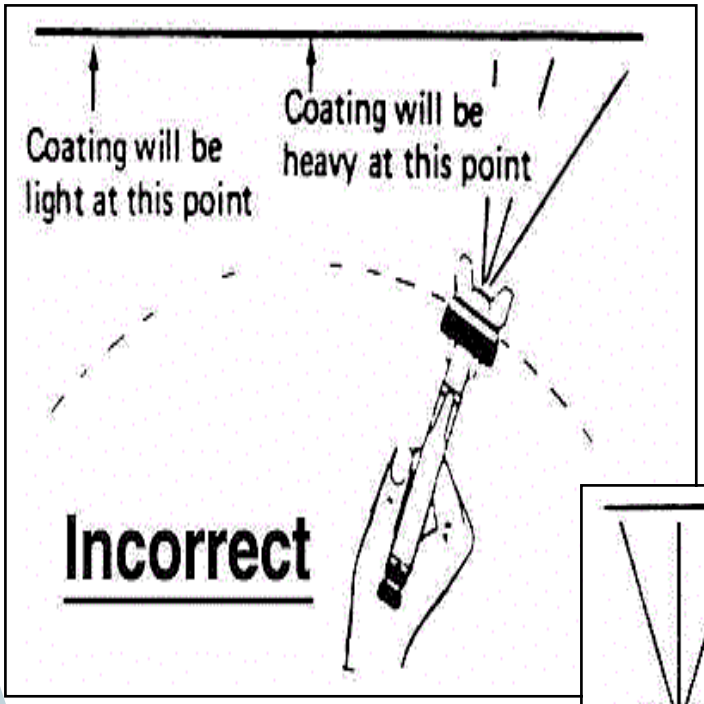
Perpendicular to surface

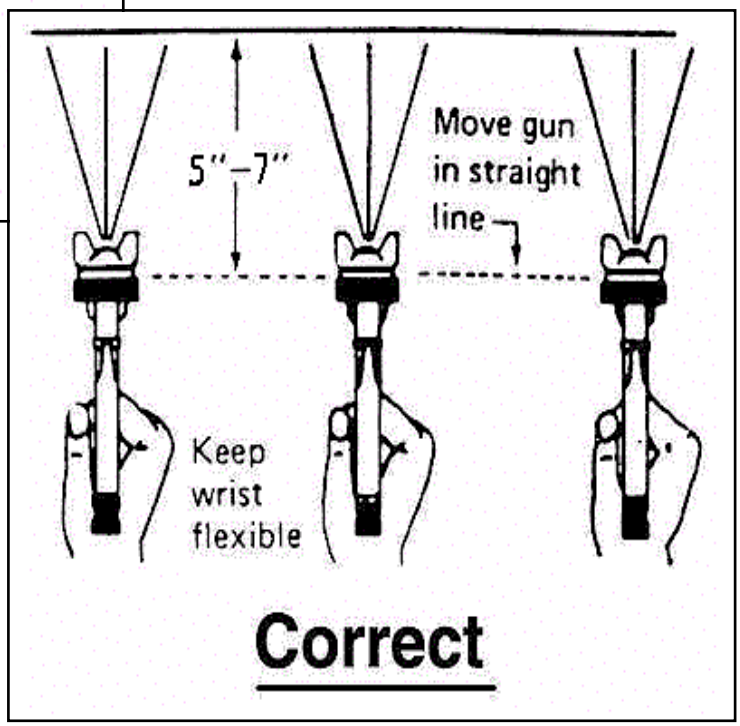
- Keep the spray pattern perpendicular to the surface
- No arcing or wrist rotation
- Use a fluid motion when you spray to reduce material consumption

Spray Techniques

Perpendicular to surface

Keep the spray pattern **Perpendicular to surface**





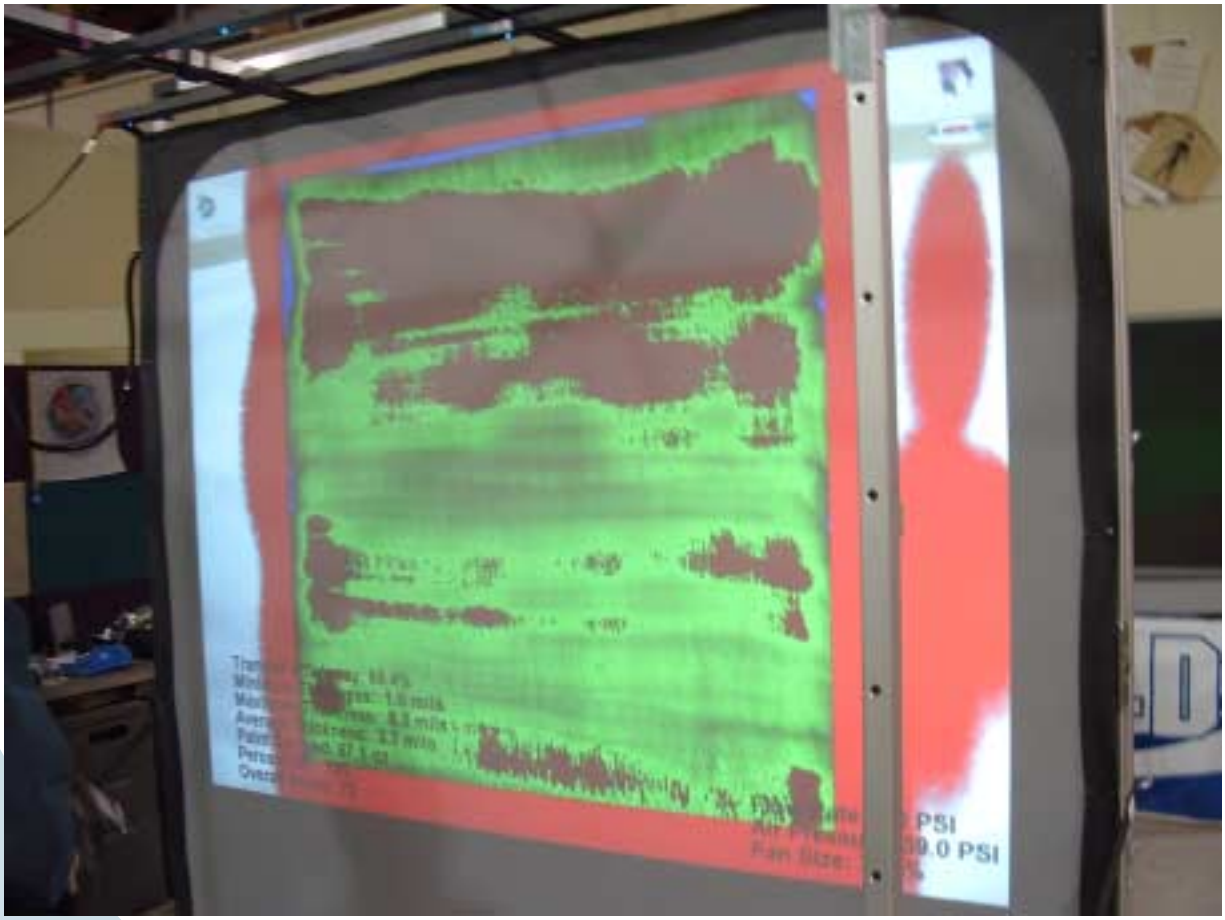
Spray Techniques
Spray Angle

- Avoid wrist rotation
- Pitch (wrist up and down) or (heel & toeing)

Spray Techniques

Overlap

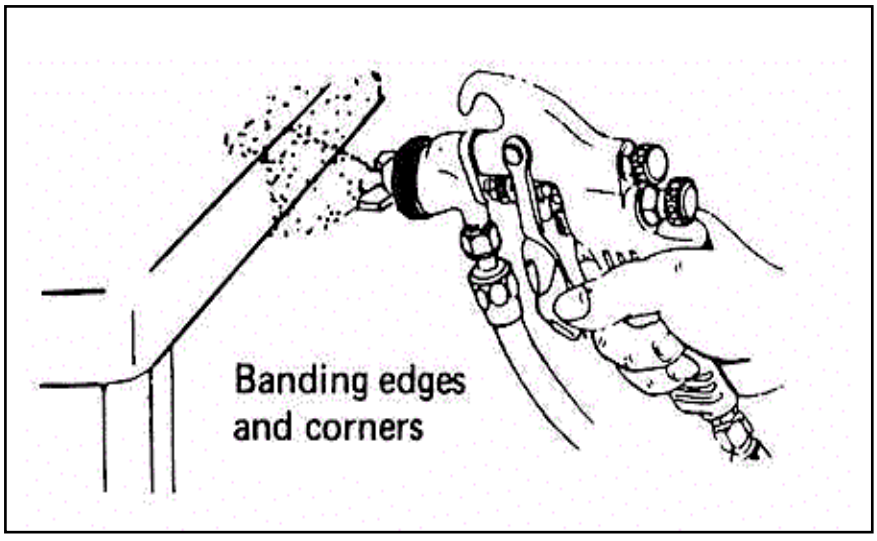
Consistent 50% Overlap



Spray Techniques

Banding & Edging

- Technique used to reduce overspray on a flat panels
- Can be used on edges of parts.



Spray Techniques

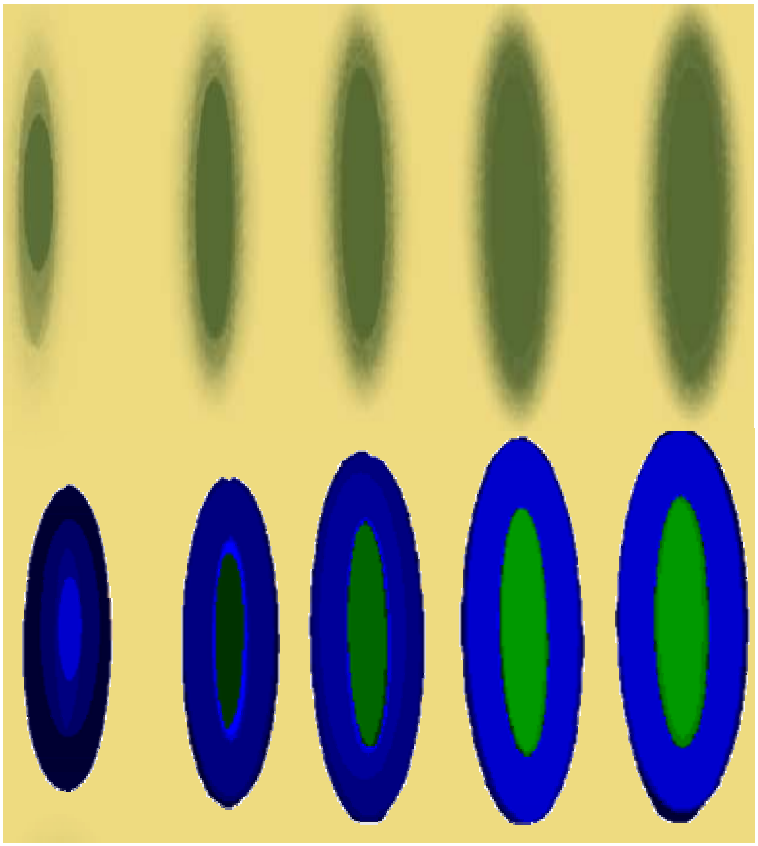
Reduce Lead and Lag

- Excessive lead and lag wastes paint
- Adds to toxicity of paint-related waste such as paper and masking

Spray Techniques

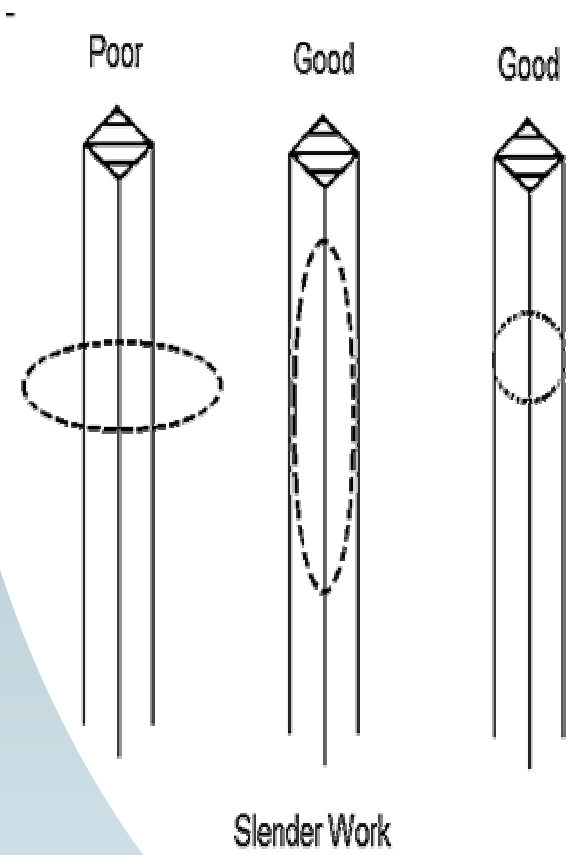
Pattern Size & Shape

- Always keep as much of the spray pattern on the part as possible.
- Shape the pattern to the part



Spray Techniques

Pattern Size & Shape



Slender pieces should be coated with a narrow horizontal or vertical pattern

- For a vertical pattern, the gun speed should be increased to account for the added time the part is in the pattern.
- Gun motion should always be lengthwise to the part.

Spray Techniques

Plan of Attack

- Study the geometry of the part to be sprayed and visualize size and shape of spray pattern.
- The sequence should feel comfortable and be consistent throughout the job.
- Use partial trigger, edging and full fan banding when appropriate.

Spray Techniques

Plan of Attack

- Adjust your plan of attack

Spray Techniques

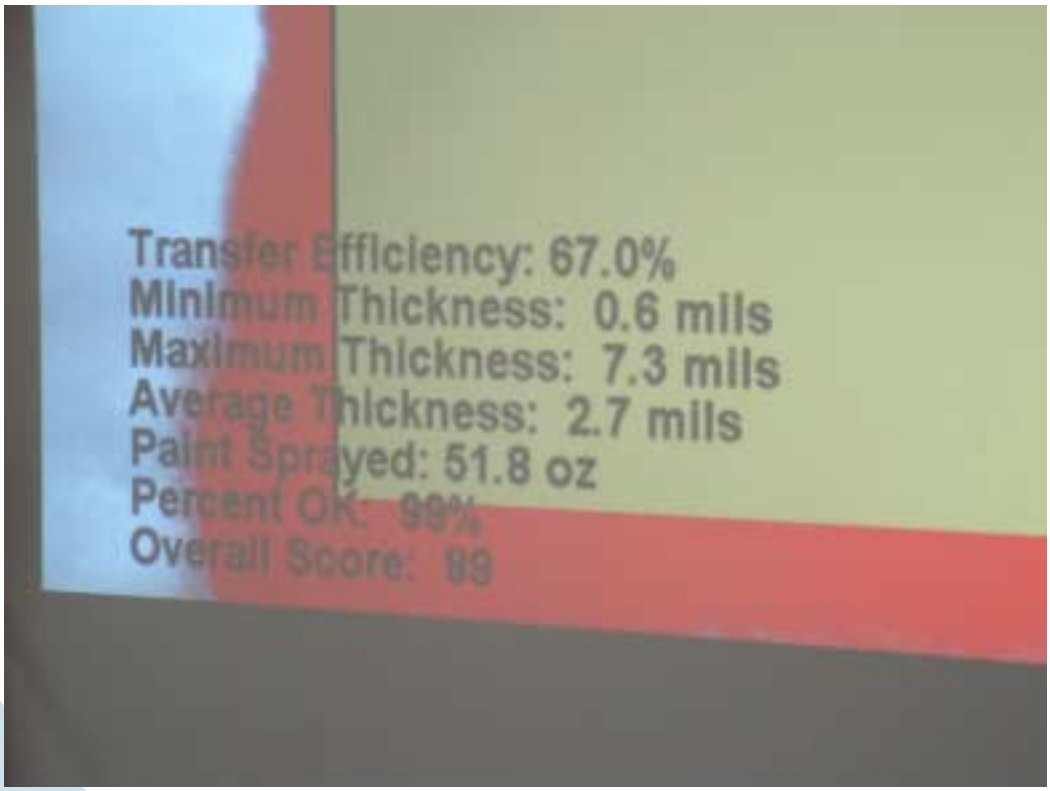
Transfer Efficiency

- The amount of paint that is applied to the part.
- Even good painters can have a transfer efficiency (TE) of 50% or less.
- 10% increase in TE can have dramatic effects on costs and air emissions

Spray Techniques

Transfer Efficiency

- 10% increase in TE can have dramatic effects on costs and air emissions



Spray Techniques

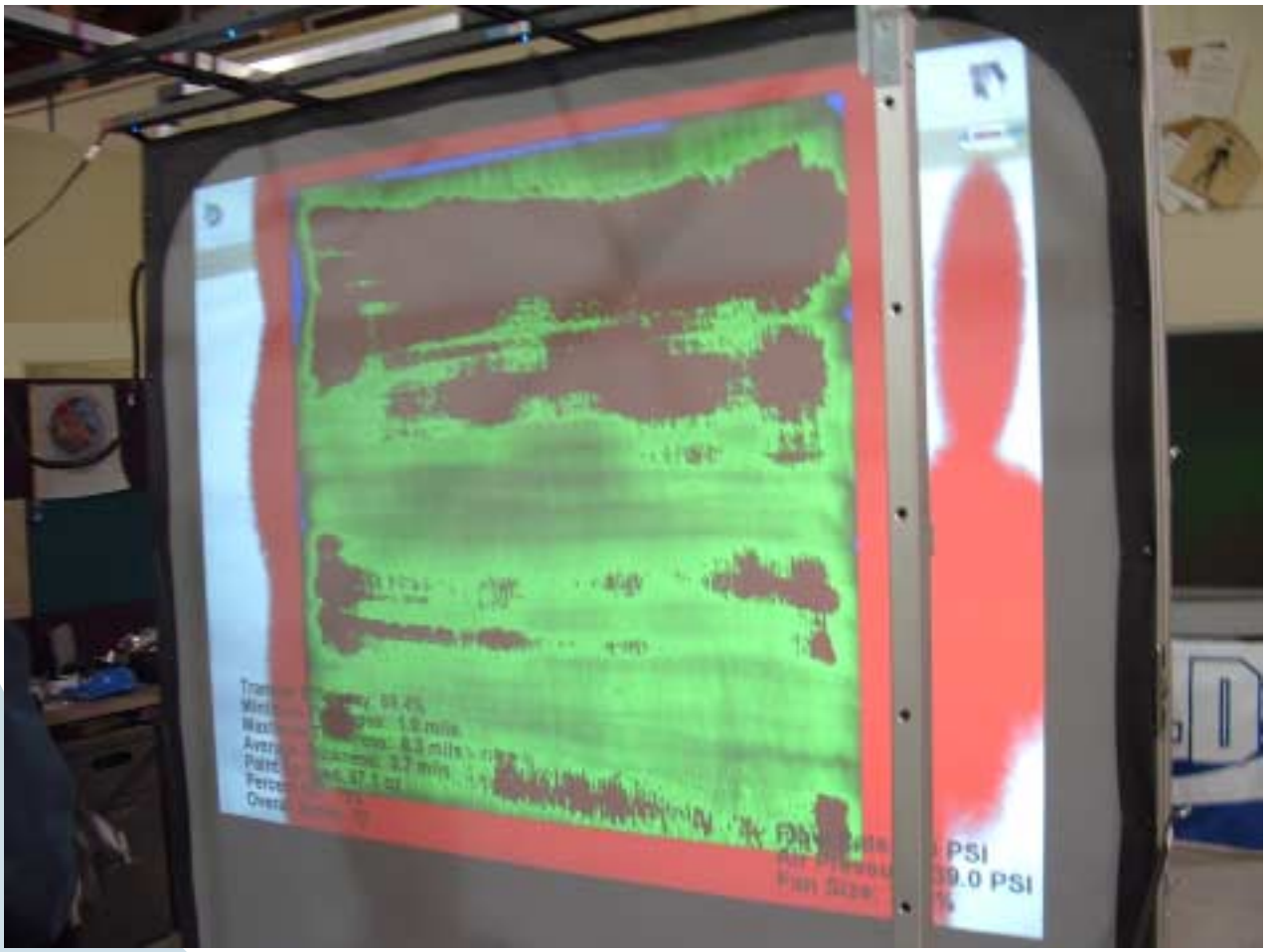
Build Efficiency

- The amount of part surface that has the optimal mil build or target mil build on it.
- Very high TE can still produce low quality of work if the target mil build is not achieved.
- Consistency is the key to build efficiency.

Spray Techniques

Build Efficiency

- Consistency is the key to build efficiency.



Spray Techniques

Practice Time

- Wet paint in booth
- Virtual reality training system

Spray Techniques

Practice Time

VirtualPaint training system

- Instrumented HVLP spray gun
- Wide range of spray gun settings
  - Coating flow rate
  - Air pressure
  - Fan pattern size
- Visual and statistical feedback
  - Overspray
  - Mil build average
  - Coating accumulation mode
  - Transfer efficiency
  - Paint consumption
  - Elapsed time

Spray Techniques

Practice Time

STAR training

- Actual in booth training plus class-room lecture
- New STAR schools can be set up

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