

Replacing Mechanical Fasteners with Adhesives- Two Applications

Paul Gross, Product Engineer

Sika Corporation

September 28, 2005

WS-14: Alternative Joining Methods: Using Adhesive Fasteners

Topics

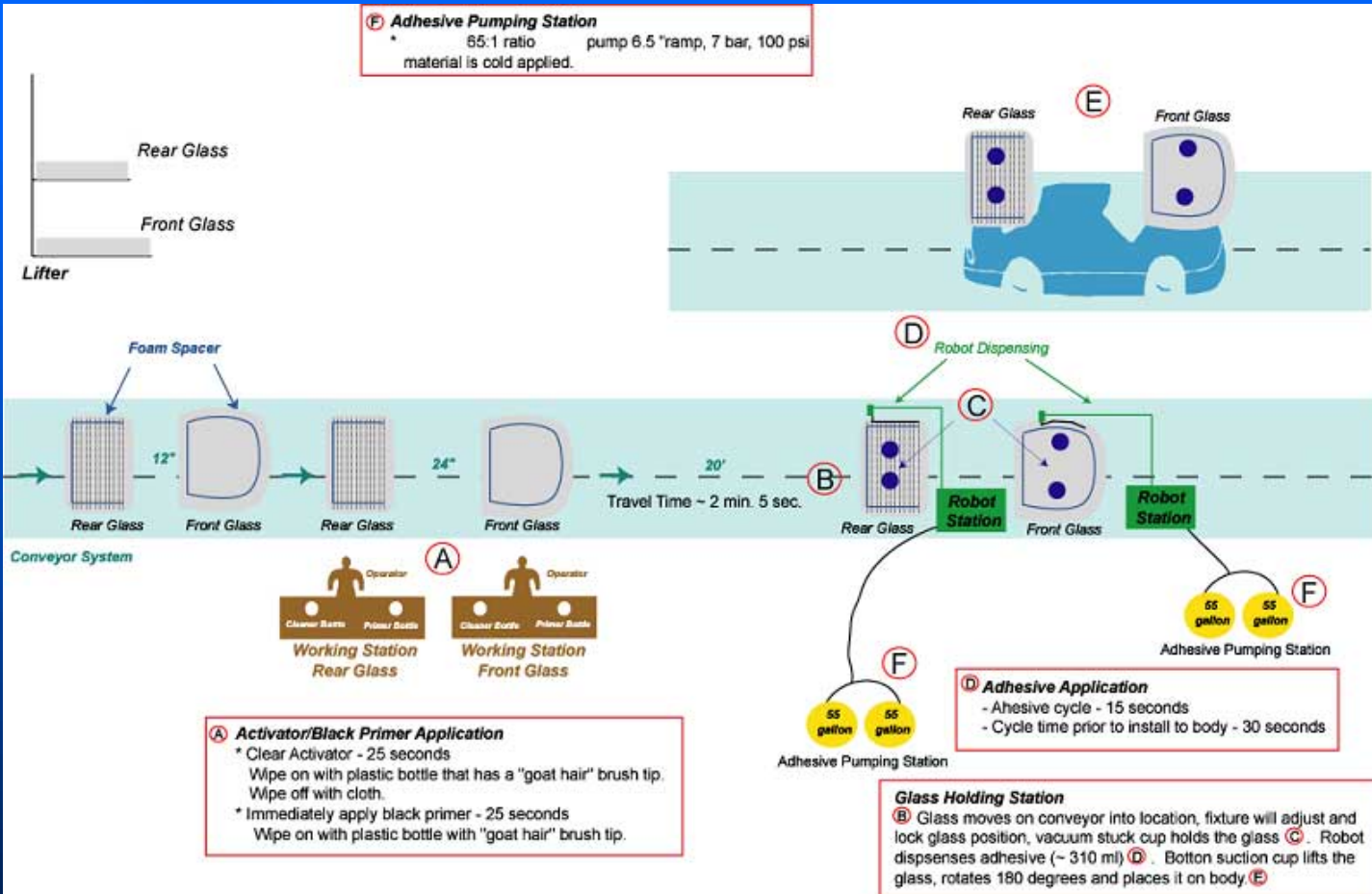
- Identifying Application Opportunities
- Application Example #1
 - » Computer Cases, Welding vs Adhesive
- Application Example #2
 - » Utility Trucks, Rivets vs Adhesive
- Questions, Comments

Identifying Application Opportunities

Customer Considerations:

- Suitable application for bonding, including substrate adhesion and performance requirements
- Process Integration
- Capital Costs
- Safety/Health/Environment Impact
- Consult with your adhesive supplier early on and often!!

Process Integration



■ Consult with your adhesive supplier!!

Capital Costs

- Fixtures, jigs
- Application/pre-treat equipment
- Conveyors/
rack systems



- Consult with your adhesive supplier!!

Safety, Health, Environmental

- Cleaners/ Primers/ Adhesives
- Toxicity
- Flammability
- Exposure limitations-
 - » Skin Contact
 - » Inhalation
 - » Oral

- Consult with your adhesive supplier!!

Application #1, Computer Cases



Application #1, Computer Cases

Application-- electronic equipment racks and doors: steel stiffeners for doors and sidewalls

Old system: Welding

Customer Needs:

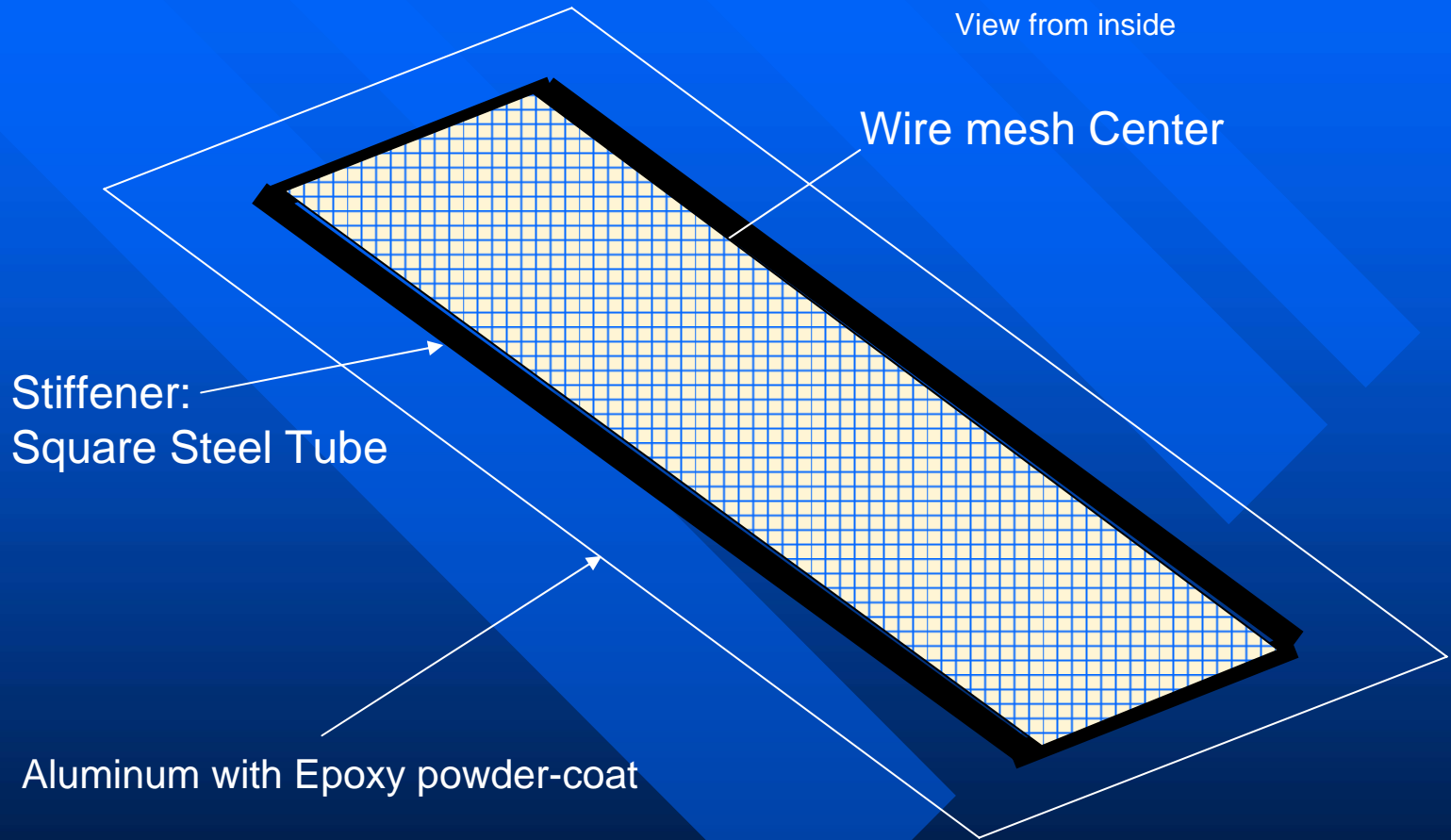
- Eliminate Welds
- Increase Structural Integrity
- Black Product
- Improved Aesthetics



Application #1, Computer Cases

Server Rack Door

View from inside



Application #1, Computer Cases

Application Details

- Passed customer's internal test requirements, including:
 - Static Load test
 - Drop test
 - Shipping vibration test
 - Thermal Cycling tests.
- Prototype tests resulted in positive field trial results
- Production converted from welded to bonded process
- Adhesive Type: Two component methylmethacrylate-based (MMA) structural adhesive

Application #2, Utility Trucks



Application #2, Utility Trucks

Application— rivet replacement for aluminum sidewalls and door skins on utility trucks

Old system: Rivets

Customer Needs:

- Eliminate rivets
- Reduce weight and cost
- Improved aesthetics
- Aluminum and galvanized steel bonding
- Provide additional structural support



Application #2, Utility Trucks

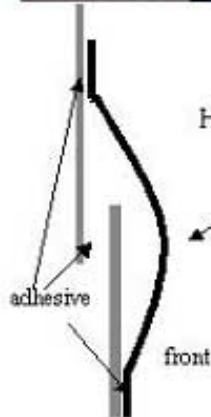


UCBC 12-6 Sidewall, back

6105 Aluminum Extrusions bonded

5052 Aluminum Sheet

Top panel bonded to
Bottom Panel



Horizontal Bond Seam

adhesive

front

6105 Aluminum Extrusion

UCBC 12-6 Sidewall, front



Application #2, Utility Trucks

Application Details

- Fixture tables designed
- Plant process adjusted for sidewall assembly
- Smooth sidewall allows easier graphic application
- Minimal read through of adhesive joints
- Workers trained on safety
- Workers trained on open time, fixture time, general application parameters
- Adhesive Type: Two component methylmethacrylate-based (MMA) structural adhesive



Questions/Discussion

- Contact your adhesive supplier before, during, and after your bonding design to ensure your expectations match the end use.

Paul Gross, Product Engineer

Sika Corporation

September 28, 2005

