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Photo courtesy Lord

Sign Assembly

ADHESIVE USE IN THE SIGN INDUSTRY

Proper application is crucial to success.

By Anita LaFond

While increasing numbers of signmakers have become accustomed to replacing welding work and mechanical fasteners with structural adhesives, it is apparent there is more to this 'changeover' trend than simply switching from one method to another. Knowing how to properly apply the adhesives is crucial to the success of the final product.

The types of structural adhesives used in signmaking include urethanes, epoxies and acrylics. They offer very high shear strengths, ranging from 13,790 to 27,580 kPa (2,000 to 4,000 psi), which means they can be stronger than welding or riveting.

These adhesives are also ideal for both indoor and outdoor applications, as they are weather-tolerant and

Photos by Jason Cramp

The oval-shaped logos for A&W restaurants are bonded with structural adhesives.

will maintain strength over a wide temperature range, from -40 to 170 C (-40 to 338 F).

Acrylic-based adhesives are primarily used to bond metals, such as aluminum, stainless steel, cold-rolled steel, brass and copper. Urethane-based adhesives are used for applications involving plastic, wood and/or foam. Epoxies, meanwhile, can be used on metals, plastics, concrete, wood and foam materials, but tend to become brittle at low temperatures, which can limit their use in some locations.

Benefits

Structural adhesives offer many benefits when compared to welding or mechanical fasteners, due to their nature.

"Adhesives eliminate the stress-concentration points that can develop when rivets are used to join materials," says Michael Verdi, senior technical representative for Lord, which manufactures specialty structural adhesives and polyurethane (PU) coatings.

With adhesives, the stress is instead distributed across the entire bond line. This means added strength and durability. It also enhances structural integrity because there are no leakage points; the bond line prevents water from seeping into the sign and causing 'fogging,' as can happen with riveted joints.

"Structural adhesives also avoid the problem of warping, which is usually encountered when welding aluminum frames, but can also occur with other metals," says Verdi.

Indeed, the high heat levels used in welding operations can cause a sign's aluminum frame to buckle. This buckling may be minor, but can alter the design somewhat, detracting from the sign's overall appearance.

"Along with eliminating warping, adhesives do not require as many extra steps as would be involved after a welding assembly is completed," says Verdi. "All of the additional work to finish the welded assembly—including sanding, grinding and cleaning—is simply not necessary when using adhesives. You just place the adhesive, wait for it to set and you are good to go."

Simpler processes mean the use of structural adhesives in the sign industry is not only a time-saver, but also less expensive than the alternatives.

"Adhesives do not require highly skilled labour, as with welding operations," Verdi says. "They are relatively easy to apply and save time and money compared to the reworking that can be necessary as a result of welding errors."

Further, by eliminating welds and mechanical fasteners from a project's design, adhesives reduce overall sign weight, as well as the shop's costs relating to rivet inventory, welding supplies and consumables.

"The weight reduction is especially beneficial to manufacturers who produce very large signs that are mounted on walls or high in the air," Verdi says.

It is also worthwhile to note signmakers making the switch to adhesives do not need to redesign their products accordingly.

"Structural adhesives can be used as a direct drop-in replacement for welding or rivets," says Verdi. "Signs do not have to be reworked to accommodate them."

Certification

Underwriters Laboratories (UL) is an independent product safety testing, certification and inspection organization that evaluates a broad range of components, materials and systems to ensure compliance with specific requirements. The UL mark has become a trusted symbol of worldwide safety standards, recognized by regulators, distributors, insurers and customers alike.

With an increasing number of sign installations needing a UL listing to comply with local and/or national guidelines and ordinances, more sign shops are making sure their finished products are UL-certified. And this evaluation process can be completed in less time if a sign's manufacturer has used UL-certified components.

UL of Canada's (ULC's) listing service for finished signs covers illuminated channel letters using neon and light-

Photos courtesy Fine Lines Sign Co.

Fine Lines Sign Co. in Hamilton uses structural adhesives in many assemblies, including these signs for TransGlobe Property Management.

Photo by Peter Saunders

For this auto dealership sign, the metallized logo was secured to the 'head' of a pylon sign using a structural adhesive.

emitting diodes (LEDs), sign cabinets, banners, neon window signs, awnings, changeable message signs and neon outline lighting. Individual components, meanwhile, fall under UL's North American component certification program.

Some structural adhesives have been tested and approved by UL for use in electric signs and displays, allowing signmakers to use them confidently, knowing they meet the established standards. There are UL-recognized adhesives certified for bonding cold-rolled steel, aluminum, stainless steel and the thermoplastic polyphenylene oxide (PPO).

That said, custom lab testing may also be necessary to determine the correct adhesives are chosen for a specific sign assembly.

Assembly procedures

Signmakers who choose adhesives over alternative fastening methods can benefit from technological advances, but only with the right hands-on training.

Sign shop personnel accustomed to welding or mechanical fasteners will need to learn how to use structural adhesives when building a sign assembly, from surface preparation to application to full fixture. This includes the importance of applying the adhesives in the proper environment and temperature, as well as cleaning up work areas afterwards in a safe and effective manner.

New procedures have been developed for assembling aluminum-framed signs, simplifying the process while improving adhesive coverage and increasing strength in the bonded joints. These procedures not only make the assembly itself easier, but also mean less cleanup is required at the end.

"An entire frame can be assembled in a fixture, as sort of a 'dry run,' before the adhesive is applied," says Verdi. "This gives the sign manufacturer the ability to adjust components or re-angle the frame before final assembly."

To assemble the frame, pre-drilled holes in its various components are matched and lined up to fit the adhesive dispenser's tip. At this point in the assembly process, the signmaker has the ability to 'tweak' the frame, making any adjustments to meet the project's design requirements.

"Once you get the frame to its best position, you just apply the adhesives," says Verdi. "Then, when the adhesives

Photos courtesy Lord

The Westin Prince Toronto hotel's identification and exterior wayfinding signs were assembled using adhesives that can maintain strength over a wide temperature range.

are set, the frame and sign are ready for installation. With minimal training, a shop technician can successfully bond sign frames using adhesives."

Anita LaFond is senior editorial manager at Constructive Communication and represents Lord, which formulates specialty adhesives. Lord's senior technical representative, Michael Verdi, is scheduled to present a seminar in April about adhesives for signmaking at the International Sign Association's (ISA's) 2011 International Sign Expo. For more information, visit www.lord.com and www.signexpo.com.