



MOMENTUM

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This Issue

Welding Aluminum •

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George Olive, PE

Most people in the construction industry are familiar with the welding of steel. Welding of aluminum is not as common. The following are a few items to take into consideration if you plan on welding aluminum for your next project.

Reduced Strength of Base Material

The aluminum alloys commonly used in construction achieve much of their strength from either tempering or strain-hardening. Welded aluminum removes the effects from tempering or strain-hardening in the aluminum within 1 inch of the weld. The reduced strength can be substantial. For example, the allowable tensile stress in non-welded 6063-T6 is 15 ksi. If you weld the material, the allowable tensile stress is 8.5 ksi, 56% of the original value. If you are looking at the flange of beam under uniform tension, the allowable stress near the weld is reduced to 4.8 ksi from 15 ksi, 32% of the original value.

Prequalified Welded Joints

For steel, there are many prequalified welded joints listed in AWS D1.1. For aluminum, there are no prequalified welds. AWS D1.2 lists "recommended" welded joints for aluminum. The aluminum welder must be

certified for each particular weld type. In order to be certified for each weld type, the welder must produce required test specimens that are then inspected and tested per AWS.

Welding aluminum can be very useful on a project. However, care must be taken in the location of the weld, the qualifications of the welder, and the design impacts (strength reduction) that welding of aluminum creates. Larson Engineering can assist with navigating these impacts on your next welded aluminum project.

