Exploring NDT Alternatives for Braze

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Introduction

New or advanced nondestructive testing (NDT) modalities can improve the thoroughness and speed of joint inspection. However, it is important to consider the method of joining when selecting the best method for testing. One example of this is braze inspection.

Inspecting Braze

EWI has recently encountered several cases where customers have been experiencing failures in brazed joints that had been inspected with x-ray. X-ray inspection had failed to detect joints where braze had not created a good bond, not because there is anything inherently wrong with x-ray, but because it is not the most effective inspection technique for braze. If an organization is only comfortable using one or two inspection methods, the tendency is to stick with these forms of inspection for everything and seek more advanced versions of the same technology when that method proves ineffective. For instance, if x-ray doesn't effectively inspect braze, the tendency may be to try computed tomography, which would be more expensive and not much more effective.

Alternately, by acknowledging the wide variety of inspection techniques and exploring alternate possibilities, it is often possible to find an approach which is more effective, and in some cases, less expensive. In the case of braze inspection, ultrasonic testing is more cost effective, less hazardous, and more sensitive to poorly bonded braze material. To understand why ultrasonic testing is advantageous, it is necessary to understand a little bit about the differences between x-ray energy and sound energy as they are used for inspection.

X-ray Energy vs. Sound Energy

X-ray energy goes through material and attenuates in response to changes in density or thickness such as porosity or a lack of braze material in a joint (volumetric flaws). Ultrasound, however, will only transmit through a material until some sort of discontinuity causes it to reflect (planar flaws). If braze is not totally bonded to the parent material, sound will stop at the interface between the parent material and the braze and reflect toward the source of the sound as illustrated in Figure 1. In this case, a thorough knowledge of x-ray and ultrasonic

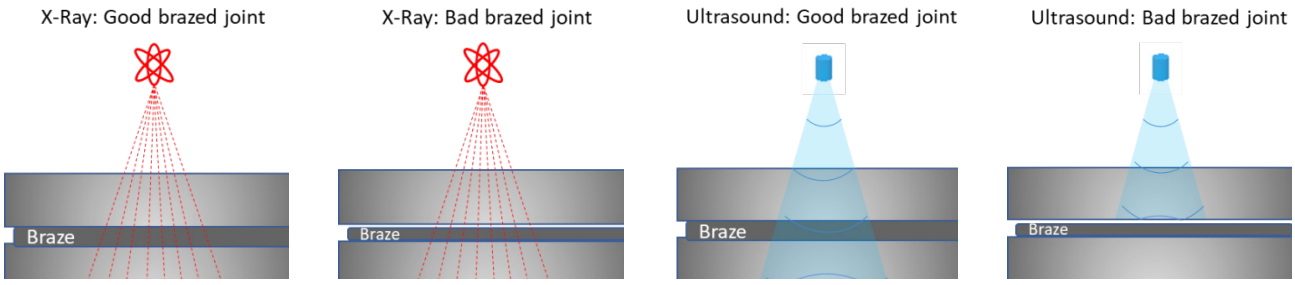

Figure 1. X-ray energy travels through the joint without being interrupted by the lack of braze, but ultrasonic energy can only travel through the braze if there is a good bond.

technologies makes ultrasonic testing the obvious choice, but to someone familiar with few or no inspection techniques, the decision is less clear, and cursory research may result in selection of another technique which is equally ineffective.

Conclusion

If you find yourself in a situation where you believe you may be using an ineffective inspection method, or you are tasked with finding a means to inspect a new product or type of weld, EWI can help. EWI's nondestructive evaluation (NDE) team makes it our business to be familiar with a wide array of inspection techniques for all types of applications, and we would be happy to schedule a design review, conduct a feasibility study, or visit your facility to assess your inspection process and provide recommendations.

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