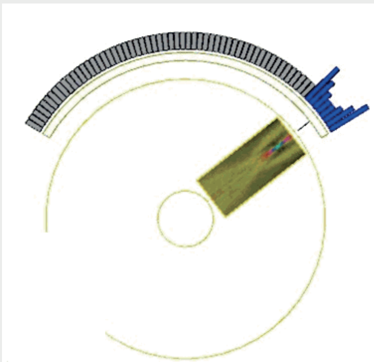
# Dynamic–Depth focusing illustrated

Dynamic-depth focusing (DDF) takes full advantage of phased-array technology to optimize resolution in depth while minimizing inspection time. To ensure consistent resolution throughout the thickness of the test specimen, one focal law is used in transmission and several focal laws are used in reception. For each delay law used in reception, the signal is digitized in a small time window centered on the corresponding focal depth. All of the partial signals are then combined to form the full reconstructed signal, providing optimized resolution throughout the thickness of the specimen undergoing inspection. The advantage of the DDF technique is that all of the depth measurements are performed in the same amount of time necessary to send and receive a single signal. DDF can be used in conjunction with electronic scanning to produce a high-resolution image.

An example is given in the following figure. For a ring transducer (curved linear array), four independent delay laws are used to focus the ultrasonic beam at four distinct depths. The blue bars displayed in the figure represent the delay laws used in reception. For each measurement position, the transmitted signal is focused at the middle of the specimen thickness. In the time of a single pulse-echo shot, all four depths are being inspected with optimized resolution. Electronic scanning is then used to translate the beam around the specimen. The animation shows in slow motion all the steps that are taking place almost instantaneously when making measurements. Calculations were performed using CIVA simulation software.



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