Analisis sinyal sistem UT-NDT SonaCT-X untuk pendeteksian keretakan tabung CNG = Analyses of signal UT-NDT system SonaCTx for detecting cracks on CNG Tube

Rhyan Edwin, author

Abstrak

Telah dilakukan simulasi dan eksperimen sistem ultrasonik yang dapat di aplikasikan untuk mendeteksi keretakan tabung CNG. Simulasi dilakukan dengan menggunakan software COMSOL Multiphysics v3.4 berbasis metode elemen- hingga hingga. Sistem disimulasikan dengan mengirimkan gelombang pulsa ultrasonik 4 MHZ angle-beam transduser 70° dari salah satu transduser yang kemudian diterima oleh transduser yang lain. Gelombang ultrasonik yang dipancarkan pada logam tabung akan mengalami efek atenuasi yang disebabkan oleh peristiwa refleksi dari adanya perbedaan impedansi akustik sehingga mampu mengurangi besarnya intensitas gelombang ultrasonik yang diterima. Analisis penelitian dilakukan dengan membandingkan intensitas sinyal gelombang ultrasonik antara simulasi dan data eksperimen yang diterima pada berbagai variasi kondisi keretakan.

.....Simulation and experiment have been carried out to characterize the propagation of ultrasonic wave in metal to detect metal fracture on inside surface of CNG tube. The simulation is using software COMSOL Multiphysics v3.4 based on finite element method. The system is simulated by transmitting waves generated by 4 MHZ ultrasonic pulse-beam angle transducer with orientation angle of 70° through the metal wall, and subsequently received by another transducer. Ultrasonic waves transmitted through the metal wall will experience an attenuation effects which is caused by the absorption and wave reflection on a surface due to the diference in acoustic impedance. As a result ultrasonic waves with reduced intensity are received. Analyses of the result are done by comparing the intensity of ultrasonic wave signal from simulation and experiment received at various conditions of cracks.