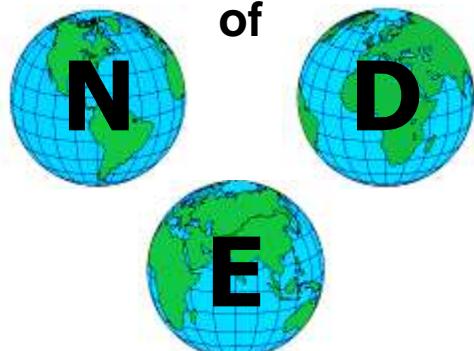


World Federation



of
Centers

2012 EDDY CURRENT BENCHMARK

Overview

The World Federation of NDE Centers pleased to announce a new Eddy Current Benchmark Problem for the 2012 Review of Progress in Quantitative NDE Meeting. Controlled eddy current measurements of a pancake coil interacting with a longitudinal through-wall notch in an inconel 600 tube were made by Professor John Bowler and his team. This is a canonical problem of great practical interest to the eddy current community and we invite colleagues from around the world to simulate the experimental responses with appropriate eddy current models and compare them to these measurements. We also invite you to present your results at a special benchmark session during the 2012 Review of Progress in Quantitative NDE meeting being held this year in Denver.

PARTICIPATION IN THE 2012 BENCHMARK SESSION

We would like to invite papers that consider the eddy current benchmark outlined here at the next Annual Review of Progress in Quantitative Nondestructive Evaluation (RPQNDE) meeting. This meeting will be held July 15-20, 2012 at the Hyatt Regency Tech Center, Denver, Colorado. To present a paper at that session, please note that the deadline for submitting an abstract is Monday, April 30, 2012 (mark on your abstract that it is for the benchmark session) . Also, please note that the advance registration deadline for the conference is Monday, June 18, 2012. For more details of the conference, visit the website at www.qndeprograms.org .

On the following page is a brief outline of the benchmark problem being considered. You can retrieve a complete description of this eddy current benchmark problem and the experimental data files at the Center for NDE, Iowa State University ftp site; [ftp.cnde.iastate.edu](ftp://ftp.cnde.iastate.edu) For the user name and password for this site please contact Prof. Bowler or Prof. Schmerr. The benchmark data and the complete description of the problem are located in the Pub folder on this ftp site in the sub-folder 2012 Benchmarks.

For any questions, please e-mail Prof. Bowler at jbowler@iastate.edu or Prof. Schmerr at lschmerr@cnde.iastate.edu .

Les Schmerr
Permanent Secretary, World Federation of NDE Centers

We have carried out a controlled experiment to acquire eddy current impedance measurements of a coil interacting with a longitudinal through-wall notch in an inconel 600 tube. The data provides a means of testing theoretical and computational models that predict the variation in the coil impedance with position due to the presence of the notch or crack. Figure 1 shows the schematic diagram of the pancake coil used with its axis perpendicular to that of the tube.

The tube has the permeability of free space ($\mu_r = 1$). Its inner diameter is 16.64 ± 0.025 mm, and the outer diameter 18.99 ± 0.025 mm. The probe is an air-cored eddy-current coil with a rectangular cross section (see Fig.1). Coil parameters are listed in Table 1. The longitudinal through-wall air-filled rectangular notch has an axial length of 12.20 mm, the depth is 100% of the tube wall thickness, and the width of the opening is 85 μm . A plane through the tube axis passes between the faces of the notch and bisects the opening.

Table 1: Coil Parameters

Inner radius, r_1	1.529 ± 0.004 mm
Outer radius, r_2	3.918 ± 0.003 mm
Height, $l = x_2 - x_1$	1.044 ± 0.005 mm
Number of turns, N	305
Isolated DC coil inductance, L_0	465 μH
Isolated coil resistance, R_0	19.00 Ω

Fig. 1

