

World Center of Education and Research for Trans-disciplinary Flow Dynamics International Internship Program

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Research title: Eddy Current Testing

Supervisor: Prof. Toshiyuki Takagi

Duration: August 19th 2009 – February 17th 2010

Thanks to the GCOE program, I have carried out some research works in the Institute of Fluid Science (IFS), I learned a lot in Prof. Takagi's laboratory about electromagnetic nondestructive inspection technology. Prof. Takagi has conducted the research on eddy current testing for many years, he and his professional group have obtained abundant accomplishments from numerical and modeling methods to inverse and benchmark problems, now the research in Prof. Takagi's lab has formed itself into a complete system, i am impressed by the high level development works in Takagi laboratory.

My research topic is nondestructive evaluation of damage using eddy current. During my internship, I conducted some simulations using two kinds of electromagnetic simulation softwares called CIVA and photo-series. The CIVA software is developed at the French Atomic Energy Commission for processing and simulating NDT data includes tools for modeling eddy current inspection of a component, The Photo-series software is developed by photo corporation in Japan. I used these two softwares to do some simulation works for the E'NDE problems proposed by JSAEM, and compared the results with the corresponding experimental values. By means of simulation test, I found that the simulation results using CIVA and Photo-series are almost the same as the experiment values of the benchmark problem, this illustrates that the CIVA and Photo-series simulation can reflect true conditions of eddy current testing perfectly, so we can use them for the theoretical calculations and the development of new ECT technologies in the future.

Besides to those works, I also read many materials about eddy current testing, and have understood the characteristics of different cracks like EDM, FC and SCC. I carried out experiments to observe the response of different cracks in eddy current testing using different probes at different frequencies. There is a benchmark SCC research project aiming at the enhancement of NDT&E of stress corrosion cracking supported by Japanese Society of Maintenology, it prepares test pieces with

stress corrosion cracking, and they are utilized for the round-robin test to measure non-destructive testing signals using various methods. I measured the first specimen of SCC benchmark project using three different kinds of probes.

I also took part in the Sixth International Conference on Flow Dynamics at Nov.4-6, and submitted a paper with the others from my laboratory in China about my previous work.

Finally, I'd like to express my heartfelt thanks to Prof. Takagi and all the teachers and staff in Prof. Takagi's lab, I really appreciate their kind help and consideration. Thank all the staff of the GCOE office for the organization of this internship program, I hope more young researchers can have the honor to get this exciting and valuable opportunity.



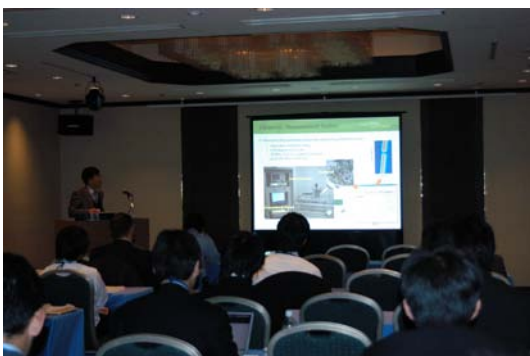
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Mochi dinner party of IFS



Year-end party with with techers and staff



ICFD Conference



New year's Eve on Jozenji street