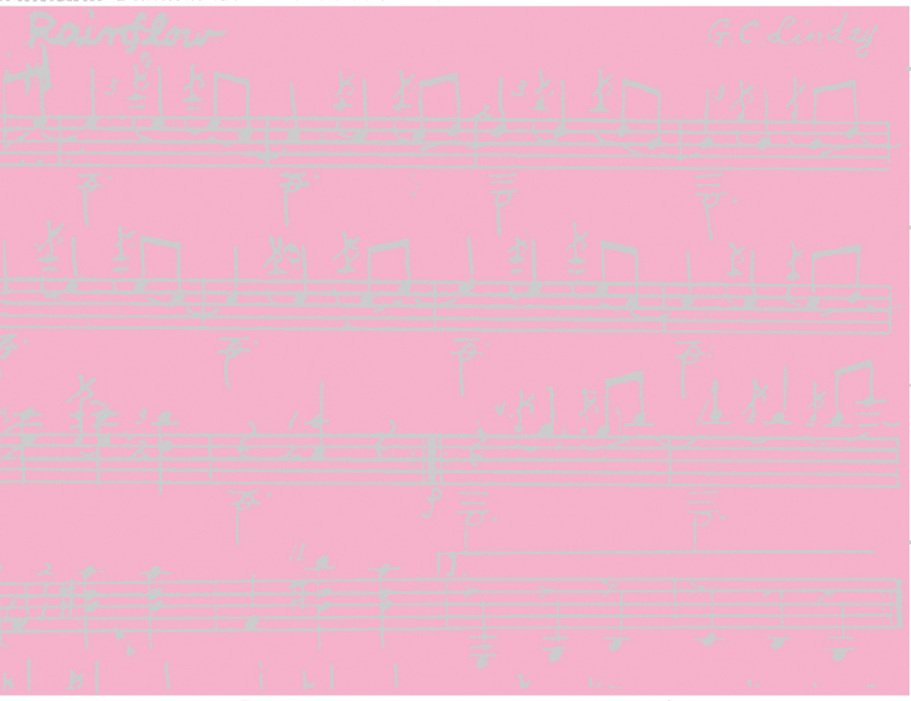
THE RAINFLOW METHOD IN FATIGUE



EDITED BY
Y. MURAKAMI

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The Rainflow Method in Fatigue

The Tatsuo Endo Memorial Volume

The papers presented at The International Symposium on

FATIGUE DAMAGE MEASUREMENT AND EVALUATION UNDER COMPLEX LOADINGS

in memory of Prof. Tatsuo Endo, the inventor of the rainflow method

Fukuoka, Japan

July 25–26 1991

(Supported by ONO SOKKI Co. Ltd.)

Y. Murakami, editor

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Total System of Fatigue Damage Measurement and Evaluation under Complex Loadings: Case Studies, Theories and Designs

Tatsuo Endo
1925–1989

A brief personal history of Tatsuo Endo

Birth: April 1, 1925 in Fukuoka, Japan
B.S., 1947: Kyushu University, Department of Mechanical Engineering
1947-1952: The special graduate research course of the first and second period, (corresponds to present PhD course), Kyushu University
1952: Assistant Professor, Kyushu University
1953: Assistant Professor, Kyushu Institute of Technology
1956: Associate Professor, Kyushu Institute of Technology
1964-1966: Visiting Professor at University of Illinois
1974: Professor, Kyushu Institute of Technology
1988: Professor, Kyushu Sangyo University
Died: July 5, 1989

Dedication

Professor Tatsuo Endo was born on the 1st April 1925 as the second son of an owner of a modern farm. The youngest of eight, with six sisters, he grew up in a very loving atmosphere. It might be this happy childhood that formed his friendly personality which lasted throughout his lifetime.

He married Shigeko in 1952. It became Shigeko's task to guard his health against overwork. This was never an easy job as he was particularly devoted to educating his students and helping his colleagues and friends.

Most of his academic life was spent at the Kyushu Institute of Technology. It was there where he developed the idea of the Rainflow Method after visiting the University of Illinois for a year and a half. In 1988 he retired from the Institute and he passed away suddenly on the fifth of July 1989.

Six months before his death, I received two letters from him. He wrote about his retirement, stating "My second life has started now!" and "Youth is not a time of life; it is a state of mind". Clearly he was looking forward to a rest after all his hard work with his students and colleagues, although the second statement seems to suggest that he knew there was not much time left for him. Even in retirement, he was asked to teach at a private university and did not obtain the peace he had been looking for. I believe he is now enjoying a second life in heaven and is watching us all scurrying around with his characteristic smile.

In addition to his great intellect, the warmth and generosity of Professor Endo were remarkable. During my seven years as associate professor with him, I often heard students say "Endo is a buddha!". The opinions of his peers were no less praiseworthy; there is no better example than Professor JoDean Morrow, Emeritus Professor of Technical and Applied Mechanics, University of Illinois who described Tatsuo Endo in 1981 as "an angel"!

Ideas and problems arising from the work of Professor Tatsuo Endo were energetically examined and discussed at this symposium. The symposium would not have been possible without the financial support of the ONO SOKKI Corporation, spiritual support of the University of Illinois group and the technical support of the Committee for Fatigue Reliability of the Society of Automotive Engineers of Japan.

It is a fitting tribute to the work of Professor Tatsuo Endo that the participants have reconfirmed the importance of the Rainflow Method, and are now looking to extend and develop his work.

Yukitaka Murakami
Symposium Chairman
Kyushu University
Japan.
25/9/91

TO: Participants in the International Symposium on Fatigue Damage Measurement and Evaluation under Complex Loadings

FROM: JoDean Morrow, Emeritus Prof. of Theoretical and Applied Mechanics, University of Illinois, U.S.A.

DATE: July 15, 1991

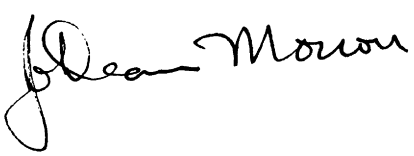
It is fitting that this Symposium be held in memory of Professor Tatsuo Endo, inventor of th rainflow method of counting fatigue cycles. His contributions were key to the development of an overall method for evaluating the service life of engineering components subjected to fatigue loading. Such methods of fatigue life prediction employing Endo's rainflow cycle counting techniques are widely used today throughout the world. To serve the needs of industry in the area of fatigue analysis, new commercial products and even several new companies have emerged.

All of you have been enlightened, challenged and have benefited from Professor Endo's research. Some of us had the pleasure of knowing him personally. We knew him to be a quiet and modest man who dedicated himself to solving important engineering problems through hard work and original thought.

I'm sure that if Professor Endo were with you at this Symposium, he would patiently try to convince you that his contributions were modest. In reality, he is acknowledged, world wid as a major contributor to our understanding of how to count cycles for variable histories of loading. What could be more basic than learning to count correctly?

Congratulations to the organizers, participants, and sponsors of this important and timely Symposium and best wishes to Professor Endo's family and colleagues.

Sincerely,



Prof. Tatsuo Endo's original papers presented at JSME meeting during 1967-1968