ELASTIC-PLASTIC FRACTURE

Landes/Begley/Clarke

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Ken Lynn

Dedication

It was with great sorrow and disbelief that we all learned of the sudden and untimely death of Ken Lynn during the summer of 1978. We have lost an imaginative and competent practitioner of the art of fracture mechanics who was able to cut through the many details of a problem and get to the essence of it to seek the practical solution. We have also lost a great friend who was intensely interested in the lives and achievements of his co-workers and contemporaries. It is with sincere appreciation for his fruitful technical life and his uplifting personal outreach that we dedicate this ASTM fracture mechanics symposium volume to his memory.

Ken grew up near Pittsburgh and in Florida; he received his B.S. in Mechanical Engineering in 1946 and M.S. in Engineering Mechanics in 1947 from Pennsylvania State University. His first employment was with the U.S. Steel Corporation, both in Kearny, New Jersey, and in Cleveland, Ohio, where he worked on brittle crack initiation and propagation in steels—a subject to which he would devote much of his efforts later in life. He was always proud of the fact that, while at U.S. Steel, he had established the strength of the cables which still support the original Delaware Memorial Bridge. In March of 1955, he joined the Lockheed Aircraft Corporation, and was employed at both the Burbank, California, and Marietta, Georgia, facilities. As a senior research engineer, he was in charge of structural materials research on the nuclear-powered bomber project as well as fatigue life prediction of aircraft wing structures. In August of

1957, he moved to the Rocketdyne Division of North American Rockwell Corporation in Canoga Park, California, where he began his serious development as a practitioner of fracture mechanics. Through a series of increasingly challenging assignments in experimental stress analysis and fracture mechanics evaluations, he became a lead consultant on structural problems and fracture mechanics for Rocketdyne hardware. A key responsibility of Ken's was for development of the fracture control plan for several critical Rocketdyne structures. It was at Rocketdyne that Ken became actively involved with ASTM, and with Committee E-24 in particular. He quickly recognized the consensus agreement value of the ASTM system and strongly promoted it. Ken's approach to ASTM was not to seek leadership, but rather to stay "down in the trenches" at the technical working level. He maintained this philosophy throughout his association with ASTM, especially in later years as he came to rely on ASTM E-24 more and more for consensus agreement. Ken next became intrigued by the technical challenges presented by the field of nuclear power generation. So, in January of 1971, he joined the Westinghouse PWR Division where he became deeply involved in applying advanced fracture mechanics techniques to the analysis of pressurized water components, mainly reactor pressure vessels. Because the nuclear industry was then in the process of upgrading safety analysis in terms of fracture mechanics, he eagerly helped promote the standardization of LEFM testing and analysis through ASTM. His Westinghouse experience led him to join the Atomic Energy Commission in August of 1972. At AEC he worked on applying fracture mechanics to thermal shock analysis problems and to flaw evaluation procedures which later were incorporated into the ASME Boiler and Pressure Vessel Code, Section XI. Recognizing greater opportunity for development and application of fracture mechanics, Ken joined the Division of Reactor Safety Research—now part of the Nuclear Regulatory Commission—whereupon he took over management of a series of research programs all directed at ensuring the safety of structures in the primary system of light water power reactors. Full of energy, Ken made many contributions to the understanding and application of fracture mechanics principles for the evaluation and solution of problems faced in primary system integrity. Included among these were thermal shock, crack arrest, crack growth rates, irradiation effects, and linear elastic and elastic-plastic analysis of vessels under overpressurization. With NRC, Ken undertook a front-line leadership of grounding technical advancements in fracture mechanics through ASTM Standards. His commitment to the ASTM E-24 Committee, and their efforts, was complete. He was especially looking forward to the ASTM standardization of test specimens and methods for both *crack arrest and for J-R curve testing of ductile steels, and personally assured that all work done under his direction was aimed at this goal.*

Because of his position as a program manager, Ken did not write many technical papers; he always felt that the individual researcher should take credit for the work, not himself. However, the technical literature today is filled with articles based on his understanding and direction of research and application in the field of fracture mechanics, and many acknowledgments and technical directions can be found in these papers. Because of his experience and competence in fracture mechanics, Ken was often asked to organize meetings and to chair some of the sessions. His summaries of the information presented and his conclusions and suggested directions were looked forward to, as we knew that if we did not understand what had happened, or what was truly significant, Ken usually did, and his evaluation would help to clarify the situation.

Ken was deeply devoted to his wife, Lois, and was thoroughly enjoying the experience of his two grandchildren, by his son David, who lives in Denver; and by his daughter, June Mesnik, who lives in Los Angeles. He was quite proud of his other daughter, Carol, and thoroughly enjoyed competing against his two younger sons, Gordon and Jerry, at golf or pool. In both his technical and personal life, Ken always strove for perfection and always challenged himself and his family to the same end. One of the true joys of his last few years was to be able to take Lois with him on several business trips to Europe, where they renewed many acquaintances they had made with Ken's contemporaries, who looked to him for technical leadership in fracture analysis of reactors, and also for good times after the job was done. At the time of his death, Ken was planning for several ASTM Meetings where crack arrest, fracture toughness, and crack growth rates were approaching, to his great satisfaction, true national and international standardization. We will no longer have the benefit of his contributions to his chosen discipline, and we will miss them. But most of all, we will miss Ken himself.

Foreword

The symposium on Elastic-Plastic Fracture was held in Atlanta, Georgia, 16–18 Nov. 1977. The symposium was sponsored by ASTM Committee E-24 on Fracture Testing of Metals. J. D. Landes, Westinghouse Research and Development Center, J. A. Begley, The Ohio State University, and G. A. Clarke, Westinghouse Research and Development Center, presided as symposium chairmen. They are also editors of this publication.

Related ASTM Publications

Cyclic Stress-Strain and Plastic Deformation Aspects of Fatigue Crack Growth, STP 637 (1977), $25.00, 04-637000-30

Use of Computers in the Fatigue Laboratory, STP 613 (1976), $20.00, 04-613000-30

Handbook of Fatigue Testing, STP 566 (1974), $17.25, 04-566000-30

References on Fatigue, 1965-1966, STP 9P (1968), $11.00, 04-0009160-30

A Note of Appreciation to Reviewers

This publication is made possible by the authors and, also, the unheralded efforts of the reviewers. This body of technical experts whose dedication, sacrifice of time and effort, and collective wisdom in reviewing the papers must be acknowledged. The quality level of ASTM publications is a direct function of their respected opinions. On behalf of ASTM we acknowledge with appreciation their contribution.

ASTM Committee on Publications

Editorial Staff

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