

Positive attitude

Responsibility

Integrity

Determination

Enthusiasm

.... a **PRIDE** that leads to Success

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Preface

This book is the second edition of the book "To Enrich Life". I obtained a most wonderful response of appreciation for the first edition, much to my surprise, for which I am naturally very pleased. Hence I decided to update the book for a second edition, with more to tell of my life than what I wrote many years ago.

Years ago, I had to ask myself "Why would I like to write the book and why might anybody be interested in reading it?" My answers are "I will much enjoy writing the book" and "The book will tell about the life of a person who enthusiastically worked very hard, followed his values, and found much happiness – and that may be of interest".

My life can be thought of as a journey of two parts. In the first part, called Part 1 in the book, I grew up in Germany after World War II, left Germany for South West Africa (today's Namibia), went to South Africa to work in the mines and road construction, and finally studied at the University of Cape Town, UCT. Having finished a B.Sc. degree at UCT, I had established the values and wishes for my life. For these early years, I will therefore tell many personal events which formed my values, attitudes and ambitions,

and which I like recalling. Now the foundation had been laid in me to go out and enrich life — my life and the life of others, all within my modest capabilities.

Therefore, for the second part of my life journey, described in Part 2 of the book, from the end of my studies at UCT to the present, I will only focus on my professional and very limited philanthropic activities, and events that happened during these activities, including on my trips and engagements. I will focus on the positive aspects that I have experienced in my life, and for which I have been very blessed.

As I tell in the book, Beethoven has been my hero since high school, for how he has enriched life with his wonderful music, and amazingly he gave us some of his best music while he was losing his hearing. Of course, there have been many great people who have enriched life with great accomplishments. My dream has been to achieve as much as I could with my only fair abilities.

I remember the important events of my life very clearly. Throughout the book, I tell the events as they happened, and I use the actual names of persons and places.

While I focus in the book on my life and my experiences, I also strive to tell that engineers, in general, have contributed immensely to how wonderfully we live today — much more than generally acknowledged. The enrichment of life by engineers has been particularly profound during the recent decades, including through the relatively young field of "computational engineering" that I have worked in — namely, the "enabling of simulations of natural phenomena on the computer". Hence the book may be of particular interest to engineers and scientists who would like to read about my experiences on how this field has developed.

In closing, I would like to thank Victor Lee of my company ADINA R & D for his help in the proof-reading, typesetting and his arrangement for the publication of this book.

Klaus-Jürgen Bathe

Chapter 5 Three Years in Berkeley as a University Research Engineer and a Consultant

Having finished my doctoral studies, I was well equipped with knowledge and full of excitement to move further to try to make significant contributions in the field of finite element analysis. The technique had just been “born” for practical engineering analyses, and had not yet been accepted by many academics and engineers as a viable method to analyze general structures. My next three years at UC Berkeley would turn out to be very fruitful in advancing the finite element method, both by fundamental contributions and the development of the finite element programs SAP IV and NONSAP. Also, while working as a consultant, I created, in 1974, the first version of the ADINA program.

5.1 To Advance Finite Element Methods

It is perhaps impossible to establish when exactly the finite element method was created.

The basic process is to consider a solid or fluid body as an assemblage of ‘finite’ elements or ‘finite’ domains. Any geometric

Chapter 6 Professor at M.I.T.

I had accepted the position at M.I.T. in the middle of 1974 but I right away asked that I be permitted to start only in January 1975. The reason was that I had to complete some work for the Bureau of Mines, Denver, Colorado. I also wanted to finish my first book, "Numerical Methods in Finite Element Analysis" prior to having teaching duties. Both projects were important to properly finish. The leave was granted by M.I.T.

The Bureau of Mines was very satisfied with the work, and wanted more research and development, hence an extension of the research contract. Professor Wilson was now very generous. He convinced the Bureau that any extension of the contract should go to M.I.T. and I should be the principal investigator. I was very thankful for this gesture because the contract money arrived at M.I.T. even before I did. This meant that I could immediately hire graduate students upon my arrival at M.I.T.

Throughout the years to come, I focused all my energy on achieving as much as I could in my profession. While I had initially considered my move to M.I.T. as a move into the right

Chapter 7 The Thriving of ADINA

I have been an academic, full of enthusiasm for my teaching and research; but I mentioned already that I also wanted to closely work with industry, to learn from industry and apply my developments. The ideal way to accomplish these aims was to found a company and develop a finite element computer program.

Of course, I had developed the finite element program ADINA, first, on my own time, in my last year in Berkeley, and then, during my professorship at M.I.T. as a consultant. These developments, while at M.I.T., I pursued primarily on the weekends at the Control Data computer center in Waltham, Massachusetts. The Control Data Corp. had given me free computer time on their machines to develop ADINA, simply for making the program also available on their equipment for use by their customers. I worked numerous times until very late into the night.

In scientific computing, at that time Control Data machines were widely used for their ease of usage and efficiencies. But at M.I.T. a large IBM machine was employed, and a special effort was needed to convert the CDC 64-bit version to also run on the IBM 32-bit machines. I recall how in some very cold winter months, with high

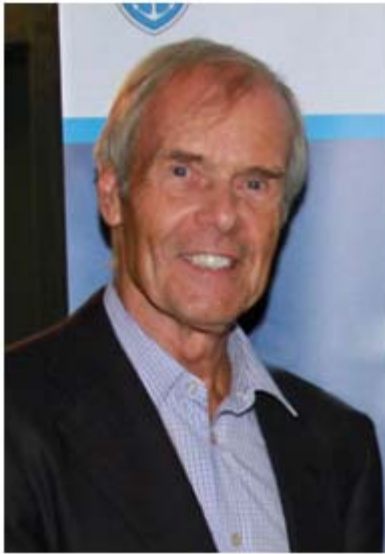
Chapter 8 Building Happiness

When I am sitting in the evening outside my room at my villa on the island St. Barths, the garden with lights in front of me, the ocean beyond but not far, seeing and hearing the waves lightly in the background, a smooth breeze touching me, the lights of villas around me, the little frogs making their music, the sky full of stars above me, then all I can feel is that life is great, that God, the Almighty, has created all the wonders around us, and that I have been immensely fortunate to experience many of these wonders which makes me very happy.

8.1 My Base for Happiness

To reach happiness and continue to be happy is a complex process and may require a different path for each of us. I have been happy all along in my life, even when I had to struggle. Indeed a struggle can be very fulfilling in that we experience new heights and possibilities within ourselves, while developing strength and new understandings, so that many times we emerge from struggles

of social justice — for leadership positions in business, government, industry and civil society in South Africa and the



"I love South Africa. To ensure a prosperous and peaceful future for all its citizens, the countries in Africa, as all nations worldwide, need excellent leaders. With good leadership, the dream of prosperity and peace for everyone will be realised."

Professor

Klaus-Jürgen Bathe, Feb. 2016

- Founder of the Program

Taken from the web site of the Leadership Program²⁵

countries nearby. Leaders can come from any discipline and hence the Scholarships are open to all UCT undergraduate students irrespective of discipline.

The aim of the Program is expressed succinctly in the text attached to the above given photo taken at the 2016 dinner of the scholars. The text is used on the Program web site.

So far I have funded or am funding 50 scholars, each for at least 2 years to study towards their degrees and focus on developing leadership qualities. It was wonderful to bring together the current scholars yearly, each February, for a dinner and speeches. At these dinners the new cohorts of students were given a little present and the award document.

A wonderful surprise for me was that Teresa, my first love and steady girl friend during my studies at UCT (see Section 3.5) contacted me, having found me on the web. She was seeking to get



At the Scholars Meeting in February 2018, congratulating a student

Epilogue

The main objective of my writing this book was to tell my life story, the way I remember it, and to do so before I am too old to remember well: To tell how I grew up and developed in my profession as an engineer, with the dream “to enrich life” – my life and the life of others, all within my modest abilities.

As I mentioned, my life consisted in essence of two journeys, first, my growing up in Germany and South Africa, with obtaining my B.Sc. degree at the University of Cape Town, and second, my venturing out into the world for further studies, becoming a Professor at M.I.T. and leading the company ADINA R & D, Inc. During the formative years of the first part, until I left UCT, I realized that it would be beautiful to enrich life and my telling of the second part of my life in this book focuses on that aim, with personal events only included when they happened during my professional and limited philanthropic activities.

But there are also some few central reflections that I would like to add in this book.