

**NUCLEAR
ENGINEERING
FOR
AN UNCERTAIN
FUTURE**

NUCLEAR ENGINEERING FOR AN UNCERTAIN FUTURE

International Symposium on the 20th Anniversary of the
Department of Nuclear Engineering, University of Tokyo

Edited by

**Keichi OSHIMA
Yoshitsugu MISHIMA
Yoshio ANDO**

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Preface

This is the official record of the International Symposium on “The Role of Nuclear Engineering for an Uncertain Future” which was held on November 5 and 6, 1980, at Keidanren Hall in Tokyo, in connection with the 20th Anniversary of the Nuclear Engineering Department, Faculty of Engineering, University of Tokyo.

Eight specialists from all over the world were invited to contribute papers to the symposium, and the professors of our Department presented a paper each. The Symposium was divided into seven sessions, chaired by professors of the Department according to their specialties.

About 200 scientists attended the symposium, and some of them joined the discussions. The symposium was fruitful and very successful from every point of view, and highly evaluated by the attendants as well as by concerned people outside.

This success is due to the successful organization and good performance of the staff of this symposium, to whom I would like to express my gratitude. I also hope that these proceedings will be useful to the specialists who are concerned with the uncertain future of nuclear engineering as well as with the role of Universities in that future.

March 1981

Yoshitsugu MISHIMA
Vice-chairman
The Organizing Committee

Opening Address

It is a great pleasure and honor for us to hold this International Symposium commemorating the 20th anniversary of the establishment of the Department of Nuclear Engineering of the University of Tokyo, with the participation of such distinguished guests involved in the development of nuclear energy from Japan and abroad. We are especially happy that many persons with whom we have had long and intimate relationships are here with us.

I would like to express my sincere gratitude to our guests from abroad who accepted our invitation in spite of their busy schedules and have come a long way to Japan. Also, I extend my heartfelt thanks to the individuals, industrial companies, and organizations which kindly contributed their financial support in response to our appeal for this symposium. This support has enabled us to organize a symposium even more splendid than we expected.

When we began planning the 20th anniversary of the Department, a proposal to hold an international symposium with the theme of "The Role of Nuclear Engineering for an Uncertain Future" came especially from young professors and staff members, and with the cooperation of the participants here it resulted in this symposium.

The 20th anniversary means that the Department was established in the 35th year of Showa, namely, 1960. Most of the professors and staff members who joined the Department have been involved more or less in the nuclear development of Japan since the 29th year of Showa, 1954, or even before. The Department has indeed been cooperating on the growth of nuclear energy in Japan till today. There have been many events, good and bad, but now the Japanese nuclear industry and technology have reached the level of high international competence with a sound foundation and Japan is playing a leading role internationally in this field. It is much more than what we could imagine in those early days. Also, today, the nuclear industry has been increasing its importance as an expected main source of energy supply for this country in the wake of the oil crisis.

On the other hand, however, we are confronting many problems such as international political relationships, the nuclear fuel cycle, and safety, and also the new technological developments of fast breeders, fusion, and so on. We have a strong feeling that nuclear energy is entering a new

era. The past twenty years have seen the establishment of a sound basis for the peaceful use of nuclear energy. Now we have a new task: building on this base to make nuclear energy a reliable main stay for the world's energy production. We believe that whether nuclear energy can meet expectations and become the major supplier of energy in the future will greatly depend on the education and research in nuclear engineering at universities.

In this regard, we strongly look forward to the presentations and discussions of participants from home and abroad during the symposium to provide us with fruitful suggestions and perspectives for nuclear engineering education as we enter our third decade.

November 5, 1980

Keichi OSHIMA
Chairman of the Symposium

Opening Remarks

Mr. Chairman, Ladies and Gentlemen:

It is a great pleasure for me to address to you on the occasion of this symposium commemorating the 20th anniversary of the Department of Nuclear Engineering of my faculty. First I would like to welcome you and thank you for your participation, particularly those from overseas who have been our colleagues and friends of the Department for the past 20 years.

Now let's look back to the past briefly.

1955 was the year when budgeting for atomic energy development was started in this country. Soon afterward, several key organizations—the Japan Atomic Energy Commission, the Atomic Energy Bureau in the Science and Engineering Agency of the government, and the Japan Atomic Energy Research Institute—were established. The development and the growth of nuclear research and industry have been remarkable ever since. The number of nuclear power stations currently in operation number 22, and total power of 15 million KWe has been installed already.

The University of Tokyo also lost no time in recognizing the great need for the education and training of researchers and engineers in this field, devoting a great deal of discussion to the optimum system. In 1958 we set up several laboratories in our Faculty of Engineering, and the Department of Nuclear Engineering was formed in 1960. Over 500 students have graduated from this department since then. They have been active in nuclear industries, research institutes, and universities, playing important roles both in basic research and in developing nuclear technologies. This Department would have been unable to thrive as it did without your kind support and help.

Nuclear energy has so many ramifications in the economic and political spheres that delineating the direction of its future development is not a simple task. Since we need to overcome various problems in order to gain public acceptance of nuclear energy, I believe it is quite timely to hold this symposium at this time with the object of clarifying the role of nuclear engineering in an uncertain future. This will surely be a good opportunity, too, for us to convey our beliefs to you in that regard. I hope that this symposium can contribute to the sound development of nuclear technology

in the world. I am sure we can find a path to the future soon. Thank you very much.

November 5, 1980

Yoshihiro HISAMATSU
Dean, Faculty of Engineering
University of Tokyo