



Inge Lyse

INGE MARTIN LYSE

1898–1990

BY LYNN S. BEEDLE

INGE LYSE was a world leader and pioneer in concrete research and its application to practice and in the organization of groups to accomplish those activities. He was born in Lysebotn in southwest Norway on October 22, 1898. He graduated from the Norwegian Institute of Technology (NTH) in Trondheim in 1923, and there he later received his doctor *technologie* degree in 1937.

In the year of his birth, reinforced concrete was practically unknown. Within his lifetime it was to become one of the predominant structural materials throughout the world, no small part of that due to Inge Lyse.

It was adversity that led him to the United States. Those early days are described best in his own words:

Soon after my graduation from NTH in June 1923 I put in an application for immigration to the USA as there were no jobs available in Norway at that time. A few months later I received my permission and in November I left for Los Angeles where I had an uncle who was optimistic about engineering jobs there. I called on the construction division of the Southern California Edison Company for a job. After three or four months I was informed that they had an opening for me as a chairman at the Florence Lake Dam construction. I accepted the job and left immediately for Big Creek.

By the end of 1925 the construction work was nearly completed, so the engineering staff was drastically reduced. The engineer in charge asked if I would be interested in joining an engineering group for the

construction and experimentation of the Stevenson Creek Experimental Arch Dam, which was to be constructed a few miles below Big Creek.

Naturally, I accepted this offer and became a member of the eight-man staff which would assist Professor Willis A. Slater from the U.S. Bureau of Standards, who was in charge of this important research work.

The Engineering Foundation sponsored the project. For a special theoretical analysis of the results, Professor H. M. Westergaard was called from the University of Illinois during the summer of 1927. He was Danish and we spent much time together.

I was the only foreigner on the staff and it was therefore very strange that Slater selected me to become his personal assistant. He also had me coordinate the work of the staff at the Los Angeles office, both for the experimental results and the preparation of the final report.

As our report approached completion, Slater told me that he had written to his friend, Professor F. R. McMillan who had recently taken over as director of research at the PCA [Portland Cement Association] laboratory in Chicago after Duff Abrams, the originator of the water-cement ratio law, and recommended me for a research position. McMillan offered me a job as his personal assistant, and I accepted immediately and came to Chicago in August 1927.

As the major work of the column investigation at Lehigh University was nearing its completion by the summer of 1931, Professor Slater asked me to fill out an application blank for a position at Lehigh University. The Depression was at that time rather serious, especially for private universities, but Slater hoped that President C. R. Richards would find a solution. And soon after the budget meeting of the Board of Trustees I received my appointment to the Lehigh University faculty from August 1931.

Lyse recognized the importance of personal relationships. Again in his own words,

The fact that Lehigh University was located in Bethlehem, Pennsylvania, where the Bethlehem Steel Company has its headquarters, and furthermore that the Fritz Engineering Laboratory was a gift to the university by one of the officials of the company, made it natural that the research work should include structural steel as well as concrete. In fact Dr. Richards, president of Lehigh University, advised me especially of this at the time I became responsible for the laboratory upon the death of Professor Slater in October 1931.

Contacts with Jonathan Jones, chief structural engineer of the Bethlehem Steel Company, led to a very good relationship. But at one of our first open house arrangements at the laboratory, we were just in the midst of testing some large reinforced brick columns when President Richards brought with him Dr. Eugene Grace, the mighty president of

the Steel Company who at that time also was the president of the Lehigh University Board of Trustees. It was therefore necessary to show them that we actually laid great weight on the studies of structural steel sections in torsion, which were carried out on a soap bubble model basis, and direct torsion tests of regular steel sections as well as other structural steel investigations. President Richards expressed later that this maneuver proved very successful.

In 1938 his own country and his own alma mater called upon him to take the chair of professor of reinforced concrete, which he held until retirement thirty years later.

Lyse served as the UNESCO expert at the Indian Institute of Technology from 1951 to 1953. As a member of UNESCO's mission, he established its teaching schedules and curricula. He was the UNESCO representative on the study of higher technical education in the USSR in 1955, UNESCO expert regarding technical education in Venezuela in 1960, UNESCO chief technical adviser to Pakistan from 1961 to 1962, and Norwegian representative to Uganda, Kenya, and Tanzania in 1965.

Lyse's honors and awards are impressive:

- Louis E. Levy Medal of the Franklin Institute, 1937
- J. James R. Croes Medal of the American Society of Civil Engineers, 1937
- honorary member of the American Concrete Institute, 1962
- Award of Outstanding Professional Achievement of the Norwegian Society of Professional Engineers, 1965
- Knight of the Royal Norwegian Order of St. Olav, 1966
- honorary member of RILEM (International Union of Testing and Research Laboratories of Materials), 1971
- honorary member of the Norwegian Academy of Technical Sciences, 1974
- honorary member of the Norwegian Concrete Association (founded on Lyse's initiative), 1980
- foreign associate of the National Academy of Engineering, 1981
- honorary doctor of engineering, Lehigh University, 1981

In addition he became a member of the American Concrete Institute (ACI) in 1926, was elected a member of the

Board of Direction of the ACI for the term 1937–1939, and was appointed a member of the Division of Engineering and Industrial Research of the National Research Council, 1937–1940. In 1938 he was elected president of the Lehigh University Branch of Sigma Xi.

Bruce Johnston (who was Lyse's student and who took over from him at Fritz Lab) once wrote: "In addition to his scientific skill, Professor Lyse holds a rare ability to spot the practical problems and to initiate and organize professional work to solve these problems...."

Deming Lewis, in presenting Lyse to the Lehigh faculty for the honorary doctorate of engineering, described his influential leadership in the following way:

Because of his work in establishing and maintaining international cooperation among engineers, it can be said that there is no nation in the world which has not benefitted from Professor Lyse's knowledge. Indeed, few large buildings and bridges built anywhere in the world have not been influenced in design and construction by the work that he has done.

A perspective of Lyse's pioneering work is perhaps best summed up by Rolf Lenschow, one his former students.

Lyse has in several fields executed a work of a pioneering nature. This work pertains to the durability of concrete in its various conditions. Typical of Professor Lyse is that he has not only carried through important research on concrete in sea water, but carried the work on to practical rules and regulations on how to produce a concrete best fitted to fulfill the requirements revealed by research.

In the construction of the enormous structures on the Continental Shelf, the shrinkage and creep of concrete acquires a dominating influence. The research work of Professor Lyse is of significant importance in that field today.

Lyse's analytical and experimental studies of reinforced concrete columns should be mentioned. The simple method that he and his associates arrived at is considered classic and is being used by designers the world over.

He was most important in the early development of Fritz Laboratory at Lehigh—but even more so in what he taught to

the graduate students: How to conduct research ... how to write ... how to create a sense of community. He started the Fritz Engineering Research Society in 1935, an informal group of graduate students and faculty, which is approaching its sixtieth year with over 600 members. His own perspective of what he had done in this and other ways was the following:

My years at Lehigh University were in many ways the most pleasant and gratifying of my life. At the Fritz Laboratory we all became one great family—the research staff, and graduate students and the laboratory staff. And after leaving Lehigh in 1938, it was a great pleasure to learn that my two most promising graduates, Bruce Johnston at Columbia University and Hank Godfrey at Roebing Steel Wire company, were appointed to take over after me.

The impact of all of this on the students who came under his influence is typified by the remarks of Knud E. Knudsen, a Norwegian who received his Ph.D. at Lehigh working under Bruce Johnston's leadership, who returned to Norway to become a leader there:

As a young student I did not fully understand the luck in studying under an internationally renowned expert, except that in my reading of the prominent professional publications I ran across references to his work by the simple identification "Inge Lyse" in italics. There seemed to be no need to add titles or affiliations to his name. Later, in my years of travelling, I found that doors to universities, laboratories, and institutions opened freely to the simple statement that I was a student of Inge Lyse.

Professors are not only scientists and teachers—they are also human beings in close contact with a new generation at its most searching and decisive period of life.

When all this has been said, however, I venture that a professor's personal and human characteristics outweigh those in the technical arena in their impact upon a student's aptitudes, attitudes, and ambitions.

The inspiration and challenge to professional curiosity that Inge Lyse has always shed upon his surroundings in and out of the university has made a good engineer of many a mediocre student by promoting interest and awakening hidden reserves, and has even produced inheritors of his professional excellence.

Inge Lyse taught us that the intellectual grindstone upon which to sharpen one's wit is of less importance than the process of learning—

that the particular field of study is predominately a means of acquiring the methodology and habit of learning.

In response to testimonials at the time of his eightieth birthday, Lyse's remarks included both his personal side and his professional side. In them he shares with us his sense of amazement at the career opportunities that came his way:

I have always been wondering about how I happened to become connected with research work in the USA. I had no other education than that from the NTH. I had attended no school, seminar, or advanced courses after leaving Norway. I had, therefore, no qualification for any type of research work. How could then the chief engineer at Big Creek select me as the only one of his big engineering staff for the research group at the Stevenson Creek Dam, and why did Slater select me as the only foreigner on his staff to become more or less his personal assistant? That Slater and Westergaard recommended me to McMillan at the PCA may not be so strange, but why did McMillan create for me the position at his personal assistant? I knew very little English at my arrival in the USA and learned it mostly from the rather rude construction crew at the Big Creek.

At Chicago the report writing became an important part of my work and here McMillan's personal secretary gave me some important training when writing and rewriting my drafts. And McMillan himself took everything with good humor when going through my manuscripts. At Lehigh I again had Slater with his patience, thoughtfulness, and great correctness. He was actually like a father to me from the day I met him in Big Creek in January 1926 until his death in 1931.

Upon Slater's death, Dr. Richards told me that I should take charge of all duties at Fritz Laboratory. I had to guide the graduate students in their theoretical and experimental work and give the graduate courses required by the curriculum as well as handle all research and experimental work of the laboratory, including commercial industrial problems. Why should such major responsibilities be given to such a young person?

The answer to Lyse's question? He was a man of unusual ability. A man of warmth. A man not afraid to respond to new opportunities. A man of vision. A man of dedication to this people, his superiors, and his colleagues.

The world has lost a true leader. But in a real sense, the structures around us will keep us perpetually aware of his greatness.

