Hoch verehrter Herr Bundespräsident,

sehr geehrter Herr Prof. Bažant, sehr geehrte Frau Dr. Bažant,

werte Festgemeinde!

Zuallererst möchte ich mich bei Ihnen, sehr geehrter Herr Bundespräsident, sehr herzlich für die Bereitschaft bedanken, die Verleihung des Österreichischen Ehrenkreuzes für Wissenschaft und Kunst, I. Klasse, an Herrn Prof. Zdeněk Bažant persönlich vorzunehmen. Dass die Namensgeberin des schönen Raumes, der den würdigen Rahmen der heutigen Feier abgibt, 1743 zur Königin von Böhmen – eines Teiles des Geburtslandes von Prof. Bažant – gekrönt wurde, möge uns ohne Anflug von Nostalgie und Ausblendung bedauerlicher historischer Fehlentwicklungen an das Gute auf der von Österreich und Tschechien gemeinsam zurückgelegten Wegstrecke in beider Länder Gang durch die Geschichte erinnern.

(*Ich wechsle jetzt ins Englische.*)

Zdeněk Bažant was born in 1937, in Prague. Four generations of his family before him were civil engineers. His paternal grandfather was a professor and rector of the Czech Technical University of Prague. As one of five members of the governing board of the Sokol organization he was taken to the Nazi concentration camp Theresienstadt. Later, in the middle of World War II, the five men were on a transport to Auschwitz. Owing to the lucky fact that due to efforts of a Professor from ETH Zurich his name was on an Allie's list of prisoners to exchange, handed to the Nazis by Count Folke Bernadotte from Sweden, he was pulled out from the train in Dresden and sent home to Prague. The other four perished in Auschwitz.

After the Communist coup in 1948, his father, a geotechnical engineering professor at the Technical University of Prague, and his mother, a Ph.D. in sociology, providently donated their large rental apartment building to the state. Nevertheless, Zdeněk was categorized at school as a bourgeois child and slated for coal mine apprenticeship. Fortunately, thanks to an opportune illness, exaggerated to make him physically unfit for this apprenticeship, and to political intervention from a family friend, he ended up in high school. According to family tradition, after graduation from high school he started studying civil engineering at the Czech Technical University of Prague. In 1960, he was graduated to civil engineer, as the best student of his class. Because of his and his family's critical stance against the ruling regime in the ČSSR, he was not admitted to Ph.D. studies at the Technical University. Instead, he was assigned to a state firm, Dopravoprojekt, where, in the beginning of 1961, he started to work as a bridge engineer. This did not prevent him from working on his Ph.D. dissertation on creep effects in concrete structures as an external student. After graduation, in 1963, he left Dopravoprojekt and started pursuing postgraduate studies of Physics, at Charles University, Prague, which he completed with a diploma, in 1966. Already in 1967, i.e. at the age of only 30 years, he obtained the Venia Docendi in design of reinforced concrete structures, from the Czech Technical University of Prague.

1966 marks the beginning of Zdeněk Bažant's scientific career abroad. From 1966 to 67 he was a Visiting Researcher at the Centre Experimental des Recherches et des Travaux Publics, in Paris. In the years 1967 and 68 he held the position of a Research Fellow at the University of Toronto and from 1968 to 69 the one of an Associate Research Engineer at the University of California at Berkeley. During the Spring of Prague, Zdeněk Bažant and his wife Iva, a medical doctor who is with us today, considered returning to their native country. The invasion of the troops of the Warsaw Pact into Czechoslovakia, in August 1968, signified the

end of these considerations. From 1969 up to this very day Zdeněk Bažant has been teaching and conducting research at the renowned Northwestern University, in Evanston, Illinois. From 1969 to 73 he was an Associate Professor, from 1973 to 1990 a Full Professor, from 1990 to date a Chaired Walter P. Murphy Professor, and from 2002 to date also a Chaired Mc Cormick School Professor, both of Civil Engineering and Materials Science. From 1981 to 87 he has held the position of director of the Center for Concrete and Geomaterials, which he had founded.

Prof. Bažant has made a large number of scientific contributions, which have pointed the way in important research areas such as fracture mechanics in consideration of the so-called size effect, micromechanics connected with the behavior of materials, viscoelasticity, in particular, and long-term deformations, in general, and last but not least, stability of structures. Many of these works are genuine and important breakthroughs in the area of mechanics of solids. His exceptional strength is the deep understanding of the physical and chemical basis of his research and the ability to translate fundamental knowledge into efficient algorithms, allowing quantitative assessments of the influence of mechanical phenomena on engineering design.

The aforementioned size effect reflects the fact that quasi-brittle material behavior does not only depend on the strength of the material but also on the dissipated strain energy. In 1984, Prof. Bažant published a simple size-effect law with a wide spectrum of applications. With that he built a bridge from the scaling laws of the theory of plasticity to classical fracture mechanics. The considerations which have led to this law are based on the fact that energy balance is only possible if the nominal strength decreases with increasing dimensions of the structure. Together with collaborators from all over the globe Prof. Bažant verified his size-

effect law for different important quasi-brittle materials such as concrete, rock, ice, fiber-reinforced plastics, rigid foams, and viscous ceramics. Moreover, he showed that damage due to crack propagation can be considered by means of energy-based material models with a characteristic length, such as the *cohesive crack model*, the *crack band model*, and nonlocal models on the basis of material softening. Bažant's fundamental concepts are widely used in several engineering fields, among them concrete engineering, naval architecture, aircraft constructions, geotechnics, mining, petroleum engineering, analysis and design of nonmetallic structures under earthquake loading, blast and impact problems, and the assessment of the risk of avalanches and landslides.

Prof. Bažant is the author of six scientific books, among them a fundamental work of approximately 1000 pages on the Stability of Structures: Elastic, Inelastic, Fracture and Damage Theories, co-authored by Luigi Cedolin, and a book of approximately 750 pages on Inelastic Structures, co-authored by Milan Jirásek. He has published 563 scientific papers in refereed journals, 52 state-of-the-art review papers and more than 200 Proceedings papers. Furthermore, he is the editor of 20 books and of 4 scientific journals, and a member of the Editorial Board of close to 30 important international journals. He is one of the top 100 ISI highly cited researchers in engineering, of all fields, worldwide. His H-index by Google Scholar is 108, which is worldwide the highest in structural engineering and concrete research, and the total number of citations of his papers is almost 50000.

Prof. Bažant's outstanding scientific accomplishments have not gone unnoticed. He was elected to member of the US National Academy of Sciences, the US National Academy of Engineering, and the American Academy of Arts and Sciences, and to foreign member of the Royal Society of London, the Austrian Academy of Sciences, the Academy of Engineering of

the Czech Republic, the Italian National Academy dei Lincei, the Spanish Royal Academy of Engineering, the Accademia di Science e Lettere, Istituto Lombardo, Milan, the Academia Europea, London, and the Academia Scientiarum et Artium, Salzburg. He received altogether seven honorary doctorates, in chronological order, from the Czech Technical University of Prague, TU Karlsruhe, The University of Colorado at Boulder, Politecnico di Milano, Institut National des Sciences Appliquées de Lyon, TU Wien, and Ohio State University.

The list of awards and medals, which Prof. Bažant has received, seems almost an eternity. It includes three prestigious medals from the American Society of Mechanical Engineers, eight equally prestigious medals and awards from the American Society of Civil Engineers, and ten medals and awards from foreign or international scientific associations and professional organizations, respectively. One of them, of which he is particularly proud, is the Wilhelm-Exner-Medal of the Österreichischen Gewerbeverein, which he received in 2008. With deep gratitude he recalls the reception in the Hofburg, given by the Austrian Federal President Dr. Fischer on the occasion of receiving this award. Let me not forget to mention that, in 2015, the American Society of Civil Engineers established the Z.P. Bažant Medal for Failure and Damage Prevention.

The scientific connections of Prof. Bažant with the Austrian Academy of Sciences and the Austrian Technical Universities are intensive and continuous. As regards the Institute for Mechanics of Materials and Structures of Vienna University of Technology, they have been going on for almost four decades. In today's celebration the Institute is represented by Prof. Josef Eberhardsteiner, Vice-Rector for Infrastructure of TU Vienna, Prof. Christian Hellmich, Head of the Institute, Prof. Bernhard Pichler, Director of the Laboratory of the Institute, and

myself, former Head of the Institute. In 1979, Prof. Bažant was one of three eminent lecturers in a short course on Computational Mechanics of Concrete at the Faculty of Civil Engineering of our university. It was the second workshop on this subject, following one at Politecnico di Milano, in 1978. There is no scientist in the wide area of mechanics who has given as many seminars at Vienna University of Technology as Prof. Bažant. By the way, the next one will be held tomorrow.

The Österreichische Ehrenkreuz für Wissenschaft und Kunst, I. Klasse, will be awarded to a great scientist and a great friend of our country. It will be awarded to a man who has never tired to praise the value of the competitive scientific sphere in the United States. “If I had stayed in Communist Czechoslovakia”, he has frequently said, “I would have worked on old-fashioned problems, and I would have achieved far less”. Fortunately, the times have charged in his homeland, which he has always cherished. A feature of his Czech compatriots, not to allow anybody to get them down, is reflected in his lifelong fight against unscientific and potentially harmful conservativism in civil engineering. A shining example in this sense is a famous countryman of his, who, about 600 years ago, placed his principles above his own life by exclaiming that the truth will prevail. In this sense, dear Zdeněk, let me combine my heartfelt congratulations on the award of this high visible Austrian decoration with the wish that you will maintain your admirable fighting spirit, in accordance with the words of Jan Hus: “Pravda vítězí”.

11-05-2016 Herbert Mang