



SYMPOSIUM TO CELEBRATE THE LIFETIME CONTRIBUTIONS OF  
PROFESSORS EMERITI TOM PAULAY AND BOB PARK

**Professor Thomas Paulay – an outstanding person**  
*International tribute to Professor Thomas Paulay  
on the occasion of his 80<sup>th</sup> birthday*

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Dear Tom, and dear Herta,

Dear Bob,

Dear Colleagues and Friends,

Ladies and Gentlemen,

Today is a very important, in fact, a most memorable day for the earthquake engineering community world-wide: we have the great pleasure to honour two outstanding scientists and structural engineers, indeed pioneers in their field – and who are also exceptional and highly interesting personalities. For me it is a special privilege and a great honour, here in this beautiful place in Christchurch, to pay international tribute to Professor Thomas Paulay. This appreciation of Thomas Paulay is on behalf of the international earthquake engineering community, but especially from a European viewpoint. We will also look at the extraordinary character of Tom Paulay. And finally I will allow myself a few personal words about my good friend Tom and his dear wife Herta.

#### **OUTWARD ACHIEVEMENTS AND INNER VALUES**

In the life of a person, especially of a well-known personality, there are as it were both outward and inner things. The outward things are visible and public and therefore in the forefront. They are evident about the person concerned, and to a certain extent everyone can see them even from a distance. These are above all the great achievements. The inner things, the inner values, on the other hand, are largely invisible, hidden from public view and are therefore in the background and cannot be seen from a distance. These are above all important human characteristics like the attitude towards others, the desire to do them good, personal ethics, belief - or unbelief – in the transcendental.

The inner values are usually of great importance for the outward ones. Without certain inner values many outward things would be missing, or at least not be as they are. We will see that also with Tom Paulay the inner values are decisive and form a firm foundation for his great achievements and success.

#### **NUMEROUS HONOURS AND AWARDS**

Amongst the prominent outward things, the visible things concerning Professor Paulay that can be seen from afar, belong the many important honours and awards that came his way. For his outstanding contributions to the development of earthquake engineering he has received the highest-possible awards from leading institutions. These would fill a long list, so that I will mention just a few, which are on an international level:

- Honorary member of the International Association for Earthquake Engineering (IAEE)
- Officer of the Order of the British Empire (O.B.E.)
- Honorary Member of the American Concrete Institute
- Honorary Doctor of Technical Sciences of the Swiss Federal Institute of Technology (ETH) Zurich, Switzerland
- Honorary Doctor of the Technical University of Budapest, Hungary
- Honorary Doctor of the National University of Cuyo, Argentina
- Honorary Doctor of the Technical University of Bucharest, Romania

## **CAPACITY DESIGN**

In the world-wide engineering community, and especially in Europe, the name of Professor Paulay is inseparable from the one concept and one design method that have changed earthquake engineering decidedly for the better: the capacity design of ductile structures. In a structure under seismic action the capacity design method establishes a clear hierarchy of strength. The designer “tells” the structure exactly where plastic regions will be, and where not, so that a deliberately chosen and suitable plastic mechanism will develop. And a clear distinction is made with respect to the detailing of potential plastic regions and those which are to remain elastic.

The philosophy of capacity design, born here in the unique professional and scientific atmosphere of New Zealand and the University of Canterbury, was brought (one could even say “smuggled”) in the early 80s by Professor Paulay into the first draft of the European Seismic Design Code, later to become Eurocode 8. I must confess: it was not very easy for us to understand this new and revolutionary design procedure. In Switzerland, in contrast to Germany, Austria and France, thinking in terms of plastic mechanisms was already established as an outcome of the theory of plasticity, but only for monotonically increasing loading. I remember well the year 1982 when Professor Paulay taught capacity design for the first time at the ETH, the Swiss Federal Institute of Technology in Zurich. Before my eyes there was a thick impenetrable fog. At first this fog didn’t lift even when we enjoyed together some fine pear juice – Williams in light-bulbs (the compound German word for light-bulb includes the word for pear – “Birne”). But still it was a great pleasure to attend Tom’s lectures, and later, as a result of his excellent pedagogic skills, the fog cleared and the revolutionary power of the capacity design method shone like the midday sun.

## **DISPLACEMENT-FOCUSED DESIGN**

At this time a revolution in the design of ductile reinforced concrete structures is again taking place, which is largely being pioneered by Professor Paulay: the displacement-focused seismic design. It is based on a reality-related redefinition of the stiffness of RC elements, which is originally due to Professor Nigel Priestley in his famous paper “Myths and Fallacies in Earthquake Engineering” presented at the Tom Paulay Symposium held in San Diego 10 years ago. Keywords in this context are: yield curvature and yield displacement are geometrical properties and independent of strength. But, on the other hand: stiffness depends on strength. Thus the new thesis and central message of Professor Paulay, to the surprise of most researchers and engineers, is: forget the traditional elastic analysis because it is irrelevant and misleading, and assign the strength freely to the different elements, such as walls and frames.

## **TORSION OF BUILDINGS**

An important area of application of the displacement-focused design method is the seismic torsional response of asymmetric ductile buildings. Here too Professor Paulay has made very creative contributions in recent years. He has shown that the approach, which has been standard all over the world for the last 40 years and is anchored in the codes, is inconsistent and may be incorrect. The most important property of a building plan is the centre of strength and not the centre of stiffness. So a much better solution is, based on the wide freedom of choice in assigning the strength to the different elements, to shift the centre of strength to the centre of mass, thus avoiding the torsion problem. The simple but ingenious message is: "Instead of solving a problem, avoid it!"

Professor Paulay has addressed displacement-focused design and the torsion problem in about 30 papers published in the last few years. They are all characterised by high creativity and the courage, when necessary, to depart from traditional ways of thinking. Thereby, he always managed to keep an overall view, especially of the design-related aims. It is always a case of a sound overall concept, and not, as with so many researchers, of a detailed consideration of often rather unimportant partial aspects. This does not mean, however, that important and perhaps decisive details are not given careful consideration.

## **INNER VALUES**

Now let's come to the inner values. Dear Tom, I have asked myself the question: What are your inner values, the roots of your outstanding achievements, of your many creative ideas and of your important works, of which I could only mention a few?

Of course, I'm not familiar with all these values; many are and will remain a secret, probably for you yourself too. But I will venture to name some of these inner values, or perhaps aspects of them, of which I assume that they form the basis of your great success.

Firstly, your human format: You exhibit profound human qualities. You are a person who always radiates warmth and humour towards other people. I and my many doctoral students have experienced this time and time again in the famous "Paulay weeks" at the ETH. Each student had to present his current thesis work, and each time you gave them encouragement and praise. Your criticism was always moderate, constructive and never damaging. The "Paulay weeks" always produced many valuable discussions, suggestions and opinions, and these weeks are among my happiest memories.

A second so to speak "inner" value, indeed a very important reason for your outstanding achievements, is your dear wife Herta. Without her care for your wellbeing, her tremendous and constant support, and without her care and excellent cooking for the many and frequent guests, you would never have been able to attempt or accomplish so much. I know that you are very thankful to Herta for all this, and likewise all of us here. So I would like to convey to Mrs. Paulay the deep gratitude of the earthquake engineering community.

## **THE OPPORTUNITY OF NEW ZEALAND**

A very important aspect is the country, New Zealand, and the University of Canterbury here in Christchurch. You had to flee from persecution by the communists in your homeland Hungary more than 50 years ago. And New Zealand generously accepted you and provided you with great opportunities - New Zealand, a small appealing country with a wonderful culture of willingness to help and of friendliness. Added to this was the harmonious teamwork and spirit and the excellent experimental facilities and technical staff of the University's

Department of Civil Engineering. No wonder that the NZ code for the seismic design of RC structures is the most progressive in the whole world!

## **EUROPEAN ROOTS**

Another “inner” value, that gave you a good foundation, is your deep European roots. You greatly value good and stable relationships between different peoples and communities, and the necessary language skills and cultural interests needed for this were always one of your great assets. Your marriage to Herta also involved a contract between persons with the respective languages and cultures of the Hungarians and Austrians. And so even up to the present day you have followed with deep interest the current political, cultural and scientific events in Europe, and you have always considered European engineering developments within your creative work.

## **THE PRESENCE OF GOD**

Last but not least I want to focus attention on one further inner value, which I know, Tom, is important to you: the Presence of God or in other words your relationship to the Creator. This relationship forms the basis of your faith, your trust and positive attitude, and also of many fruitful and interesting relevant discussions between you and many of your fellow-men. And you are aware that a rewarding and fulfilled life is enhanced by a consciousness of the presence of God. So we conclude that without a personal relationship to this benevolent transcendental Being you, Tom, would not be the person that you are.

## **PERSONAL THANKS**

Ladies and Gentlemen,

Please allow me in conclusion to address a few personal words to Tom and Herta Paulay.

Dear Tom, more than 20 years ago you offered me your friendship as a wonderful gift. Since then we have been able to keep up an intensive exchange of ideas regarding the seismic design of structures, numerous cultural topics and about God and the world. This has had important consequences. You have greatly influenced and enriched my professional and scientific life. Without your many innovative stimuli my research, my teaching, my books and publications, the doctoral theses of my students, etc. would not have turned out as they have.

Dear Herta, you and Tom have also enriched enormously the private life of both me and my wife Margrith. Without you we would scarcely have visited this beautiful and unique country of New Zealand, and most certainly we would not have got to know and to love its friendly people and wonderful landscape.

Dear Tom, dear Herta, you are both “in Ordnung” (that means roughly “OK”). No, in fact and of course, you are much much more than “in Ordnung”! So I would like to thank you for all you have done for and given to me, to all of us, and to the whole earthquake engineering community. You have greatly enriched all our lives, in a most remarkable way!

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