On the nomination of Jacques Combault to the rank of Knight in the National Order of the Legion on Honor, presented by Jacques Mathivat

My dear Jacques,

I did not need to refer to your résumé to evoke the first part of your career, which we shared while working at Campenon Bernard, where I had been since 1961.

You had just graduated from the Ecole Centrale Lyonnaise (without waiting around to receive your diploma!), and had just finished your senior project at the Service Central d'Etudes Techniques (where, surrounded by other brilliant civil engineers, you went on about a variation on the Calix Viaduct for a project in Caen) when we first met, in early July 1967.

A long and fruitful collaboration followed, not only in the Research Department of the company I then directed but also within the framework of the courses I organized at the most important engineering schools in the business.
From the beginning, your enthusiasm and your passion for bridge design and construction lead me to entrust you with the detailed planning of the Givors bridge deck over the Rhône which you carried off with confirmed professionalism. Shortly thereafter, you left for the School of Applied Engineering in Angers for the first four months of your military service before joining the Fifth Engineering Regiment in Versailles.

After launching pontoon bridges on the Loire in the middle of winter and regularly (and pompously) parading across the esplanade of the Château de Versailles as Second Lieutenant at the head of your regiment, you took up where you left off at Campenon Bernard. Your took over the plans for the fabulous and gigantic southern viaduct project on the A3 motorway (the B3 South at the time) that would later link Paris' periphery boulevard to the A86 and the A1 motorways: 80.000 square meters of bridge deck, 220 pier shafts and 2200 prefabricated segments, in 220 spans of different lengths all to be installed in 36 months, over the Ourcq canal, busy roads and railways and in the middle of the concrete maze that is the town of Bondy.

It is not surprising that one could sometimes see a pier, rising well above the others!

It was at this moment that you revealed another passion: programming and scientific calculation by way of the computer, thereby allowing you to mechanize, for the benefit of the planning group, performance checks of the 220 different spans. With the arrival of the plotter machines you discovered computer-assisted drawing that allowed you to sum up, for the benefit of the entire worksite, the essential characteristics of the 2200 segments to be built. You just might have given Bill Gates a run for his money in other circumstances!

Responsible for many large-scale projects, you are strongly associated with the conception and construction plans of the largest reinforced and pre-stressed concrete bridges built in France from 1970 to 1980 and, in particular, the viaducts over the Dordogne and the cliff at Saint-André de Cubzac, the Chavanay bridge over the Rhône and the Brotonne bridge over the Seine, at the time the longest prestressed concrete bridge in the world.

Here again, you put your taste for sophisticated studies to very good use by writing a calculations program that allowed us to study the performance of reinforced concrete in the structure, and especially the stability of the axial pylons that give the bridge its audacious look. You made a model of the bridge to make sure the structure was aerodynamically stable. I remember thinking that we had planned for everything; and we had, until a strong wind blew over the work site, causing the construction crew on the beams over the Seine to flee. I especially remember the phone call that morning telling us that the biggest cables on the nearly-completed structure had begun to vibrate, worse, collide with each other, in the high wind, which by the way was really nothing exceptional. Faced with such a phenomenon, one that had already been noted on other structures but kept under wraps, I remember our astonishment and surprise. I remember you wondered how the wind could have affected what really amounted to strings, big strings that weighed over 20 tons each. Though we didn't know it at the time, it was a problem that would mystify many great bridge-designer for 25 years! We did manage to resolve the problem: first, with pieces of wood during construction, and finally with a group of shock absorbers used on trucks.

This solution was very efficient but not what you might consider decorative, on the bridge as it is today.

But let us return to your career path.

Head of the Artworks and Special Works Department beginning in 1980, you were a major contributor to the development of external prestressing in France, and to the first composite structures with corrugated steel webs; during this same period, you also participated in the planning and construction of several large-scale cable-stayed bridges abroad, in Mexico and the United States, before being named Head of Research at Campenon Bernard.

I will name just a few of the many, major works for which you suggested innovative solutions and plans for execution from 1980 à 1993, such as the Val de Durance bridge, the first incrementally launch bridge with fully external prestressing; the Cognac bridge, the first composite bridge with corrugated steel webs; the Maupré viaduct in Charolles whose piers you designed blend harmoniously into its triangular structure; the Dole bridge in the Jura region, the first composite bridge built using the balanced cantilever erection method and the majestic arched bridge over the Rance.

During this time, and in spite of your heavy schedule, you agreed to undertake important teaching and training missions; first at the Center for Higher Studies of Construction, where you taught the class “Bridge Project - Building Methods” from 1983 to 1998; at the National School of Public Works of the State, where you undertook the course ”Strength of Materials Applications“ from 1983 to 1997; at the Superior School of Public Works where you taught “Bridge Construction Methods” from 1984 to 1988 ; at the National School of Civil Engineering where you were the lecturer of the course “The General Construction Process” from 1988 à 1995, and in the “Bridges” course of the “Works of Art” Master’s Program, from 1988 to 2008. Since 1996 you have taught and structured the curriculum of the class “Construction of Civil Engineering Works” at what is now known as the “Ecole des Ponts – ParisTech “.

In 1990, you signed onto the project that has become one of the crown jewels of French technical prowess: the Normandy bridge. Chief of the

Design Department, you were responsible for the general calculations of the work and the detailed plans for the pylons, an essential part of the project.

In 1993, you joined the GTM Group. First as Scientific Director of GTM International, then DUMEZ-GTM, you coordinated the planning and execution stages of most of the large-scale projects carried out by the GTM Group, before being made Scientific and Technical Advisor among the other directors of DUMEZ-GTM.

It is this position that took you all over the world and that allowed you supervise the construction of some of the most important works of the late 20th century. The structure bridging the Severn estuary between England the Wales, a 5-kilometer bridge that defies waves, currents and the 15-meter high tides considered among the highest in the world. (That said, the life of a bridge engineer is not a « long quiet river » flowing under bridges.) Thanks to your expertise and your reputation, you reduced budgets by doing away with useless reinforcements in the foundation's caissons; you imposed the means necessary to control the assembly of the new generation of prefabricated elements that would make-up the steel concrete composite deck of the cable-stayed bridge situated in the middle of the estuary. You traveled to Canada for the 13-kilometer Confederation bridge project, over the strait between Prince Edward Island and New Brunswick, a strait overcome by ice four to six months of the year. The bridgework began in 1994 and had to be finished and the bridge open to traffic by June 1st 1997. Only 27 months, as the sea is frozen and impenetrable during the winter months. You met the challenge by constructing the bridge in its entirety off-site and simply setting it into place afterwards.

The underwater tunnel between Denmark and Sweden, the project of a fixed link via an immersed tunnel and several cable-stayed bridges between Pusan and the Island of Keoje in South Korea, the project of a fixed link between *terra firma* and the Island of Pingtan in China, (your secretary--oh how deserving!-- has to run from travel agency to travel agency.) It was a heavy load, not to mention the multitude of invitations to present papers and publications at international congresses and symposia.

A new challenge befell you in the late 90's: the bridge linking Rion to Antirion at the mouth of Gulf of Corinth in Greece, a project launched by GTM after ten years of obstinate lobbying; another crown jewel in French *technique.* Your thoughts on the matter were decisive with regards to the feasibility of the project. You forwarded the idea of metallic inclusions even before understanding how they worked! You realized early on that the structural concept of this exceptional cable-stayed structure had to be modified and you undertook the necessary measures: at the last minute, you simplified the shape of the caissons at the foundation of the pylons, simply set 65 meters deep.

In June 2000, Groupe GTM was merged with Vinci, a result of Campenon Bernard and SGE, among others. For you the cycle was complete, and you decided to leave Vinci in September 2001 for a break, and to fly on your own.

Retired? Hardly: only a few days after your 'last day,' Systra, specialists in railroad bridges invited you to join them to guide its young staff and tie up the plans for the long-awaited works for Eurostar in England, the metro systems in New Dehli, Santiage and Dubaï. Three months later the Chinese Ministry of Public Works asks you to evaluate the feasibility of what will be the biggest cable-stayed bridge in the world: a 1088 m long span. The job offers continued—and continue— to pour down. You even went to the United States where in 2005, your friend Craig named you Technical Director of Finley Engineering, an American consulting form specialized in bridge design and the export of the prefabrication techniques perfected in France 50 years earlier.

You have received several distinctions and awards in your career: in 1991, the FRENCH ASSOCIATION FOR CONSTRUCTION, which I then presided, awarded you its prize for your important contributions to the development of large-scale reinforced and prestressed concrete structures and calculation programs, the theory of local stresses generated in the stay cables in the vicinity of the anchor devices, the concept of PT tendon layout fully external and well adapted to bridges incrementally launched or built according to the segmental progressive construction method ; in 1996, you received the Mongolfier Prize from the SOCIÉTÉ D'ENCOURAGEMENT DE L'INDUSTRIE NATIONALE in the very room where we are tonight. In November 2004, the

INTERNATIONAL FEDERATION OF CONCRETE awarded you its most prestigious honor, the FIB Award of Merit, in New Dehli for your exceptional career and your numerous accomplishments.
You took things to yet a higher level when, in 1984 you represented France and our profession at the International Association for Bridge and Structural Engineering and were admitted, in 1987, to the Working Commission N°3 dedicated to concrete structures and of which you served as Vice-Chairman beginning in 1993, then Chairman in 1997. You were also admitted to the Technical Committee where you stayed until 2001, at which time you became Vice-President of the association and admitted to the Executive Committee.

The International Association for Bridge and Structural Engineering today boasts 3500 members from over 100 countries. Until the 90's the president of this association was co-opted and Swiss, two criteria specified in the Association's charter. Now, the president of this large international association is not necessarily Swiss and is elected by the assembly of accredited members. After a memorable election at the annual symposium in Budapest in 2006 you became the first French president of the International Association of Bridge and Structural Engineering. For our country this is an honorable distinction, a reflection of the role our profession plays on the international level. This is, for you, your lovely wife, that fabulous hostess Danièle, your children and grandchildren, the crowning achievement of your brilliant career where humanity, esteem and faithful friendship have had their place and who shine among all of us this evening.

And I will now ask Danièle, who has always been at your side, to help me pin on the insignia of the Order that honors you this evening.

Jacques Combault, "on behalf of the President of the Republic and by virtue of the power vested in me, we name you Knight in the National Order of the Legion of Honor."