Awards Committee Report
ICF ExCo Meeting
May 19, 2011, Anaheim, CA

This report is prepared by the Chair of the ICF Awards Committee, Ashok Saxena, for discussion at the ICF Ex Co meeting in Anaheim, CA on May 19, 2011.

Upon the recommendation of the Treasurer of ICF and seconded by the Chair of the Awards Committee followed by an e-mail vote of the Executive Committee, the following actions in regards to awards/recognition were approved and executed at the ICF Inter-quadrennial in Sendai, Japan in October. 2010.

Establishment of the awards to recognize the service contributions of ICF leaders as follows:

a. Award consisting of the title of President Emeritus for past presidents of ICF who have reached the age of 70 were established. The awards were conferred upon the following individuals during the Sendai meeting.
    i. Professor Takeo Yokobori
    ii. Professor David M. R. Taplin
    iii. Professor John Knott
    iv. Professor Dominique Francois
    v. Professor Palle Rama Rao
b. The award consisting of the title of Vice-President Emeritus for past Vice-Presidents of ICF who have reached the age of 70. The award was conferred upon the following individuals in Sendai, Japan.
    i. Professor Kamel Salama
    ii. Professor V. Panaysyuk
    iii. Professor Teruo Kishi
    iv. Professor Robert Goldstein
    v. Professor Hwang Keh-Chih
c. The award consisting of the title of Secretary General Emeritus for past Secretary Generals of ICF who have reached the age of 70. The award was conferred upon the following in Sendai, Japan.
    i. Dr. Tadashi Kawasaki

The open competition for selecting the award winners to be recognized at ICF-13 will begin immediately after the approval of the Executive Committee in Anaheim.

The following proposals for changes in the awards program are proposed:

1) **To create a new award designated the "ICF Presidential Lecture" to be given by the current ICF President during a Plenary Session in the middle of the quadrennial conferences. This lecture will complement the ICF Opening and Closing Lectures that have been a tradition for some time.**
2) To remove the limit of 50 (this limit has already been exceeded by 2 as per the last count) for the number of living ICF Fellows. This statute should be changed to state that "**At each Quadrennial Conference a list of new ICF Fellows will be announced upon the recommendation of the Awards Committee. The number of such new Fellows should generally be five per Quadrennium".**

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3) **The title ICF Honorary Fellow should be changed to ICF Academician and all previous ICF Fellows should be recognized as ICF Academicians.**
4) **Proposal to establish a silver medal in the honor of Dr. Constance Tipper. Her bio is attached as part of this report. The proposal is for the Tipper Silver Medal to be awarded to a mid-career researcher in the field of fracture.**
5) **A proposal to initiate gold medal in the name of Paul C. Paris (subject to his formal approval) to honor a senior researcher in the field of Structural Integrity whose contributions are truly pioneering and well known. See the contributions of Paul Paris in the attachment. The first such gold medals will be presented at ICF-13.**

Respectfully submitted,

Ashok Saxena, Chair
ICF Awards Committee

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Constance Tipper- Notable Contributions

"Her vigour in prosecuting her work in an extremely male preserve will always be remembered and admired by those who came into contact with her . . ." Thus the late Lord Baker about Constance Tipper, the distinguished yet unpretentious woman who made an important contribution to Britain's survival in the Second World War. She was the first to discern the reasons why Liberty ships tended to break in two.

It was in 1943 that Tipper began her important work on the cause of brittle fracture in Liberty ships, after the appointment of J.F. Baker (later Lord Baker) as Professor of Engineering at Cambridge. The Liberty ships were the merchant ships, constructed with great haste at the beginning of the war, which brought vital supplies across the Atlantic to Britain. A number of these ships, complete with their cargoes, had been lost in heavy seas, breaking up like glass, a crack running instantaneously right round the ship. Tipper revealed that the fault in the ships lay not in the method of fabrication and use of welding, as had been suspected, but in the material used, which became dangerously brittle under certain conditions. Her name is now known to engineers of all ages as the creator of the "Tipper Test" for determining brittleness in steel.

Constance Elam, the daughter of a surgeon, started her education at St Felix, Southwold, and went to Newnham College, Cambridge, in 1912. She graduated in 1915 with a Third in Part I of the Natural Sciences Tripos, but this did not prevent her from achieving a DSc in London in 1926, and a ScD in Cambridge in 1949.

In 1915 she went to the Metallurgical Department of the National Physical Laboratory in Teddington, but quickly moved in 1916 to the Royal School of Mines in Kensington, west London. She was appointed Research Assistant to Sir Harold Carpenter at the Royal School of Mines in 1917, and awarded two successive Fellowships - the Frecheville (1921-23), and the Armourers' and Braziers' (1924-29). Having evolved a method of preparing metal crystals she worked at this time with G.I. Taylor of Cambridge, accumulating data on the deformation of these crystals under strain. The Royal School of Mines arranged with Lord Rutherford at the Cavendish Laboratory that whilst continuing to be employed by the school she should work in Cambridge.

Her old college, Newnham, made her a Research Fellow for the year 1930- 31. The university, in the Cambridge fashion of those days, gave her testing facilities in the Engineering Department and in 1933 a room in that department, but she had no official status even though the Leverhulme Trust awarded her a Research Fellowship for two years in 1936. Newnham elected her an Associate Fellow for three years; and in 1949 Cambridge University made her a Reader. From this time until her retirement in 1960 she was a full member of the Faculty of Engineering and the only woman at the time to hold office in that traditionally male department. She took a full share in teaching both undergraduates and graduates, and continued her research work in what little time was left after her teaching commitments had been met.

Her published work includes a book for the Oxford University Press, Deformation of Metal Crystals (1935), and The Brittle Fracture Story (1962), with the Cambridge University Press.

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After officially retiring in 1960 Constance Tipper continued until well into her seventies with consultancy work at the Barrow shipyards, and in overseeing progress and improvements in metal bridge construction and other metal structures. She bought Bank House, Langwathby, in Cumbria, in 1955, principally to enjoy the family hobby of fly-fishing. She also enjoyed gardening, water- colour painting and playing the piano.

Constance Tipper celebrated her 100th birthday in 1994, and to mark the occasion Newnham College planted a variegated sweet chestnut in the gardens, now known as the Tipper Tree. She was born in New Barnet, Hertfordshire 6 February 1894; Reader in Mechanical Engineering, Cambridge University 1949-60; married 1928 George Tipper; died 14 December, 1995.

Constance Fligg Elam Tipper (February 6, 1894 – December 14, 1995) was a British metallurgist and crystallographer. Constance Tipper specialized in the investigation of metal strength and its effect on engineering problems. During the Second World War, she investigated the causes of brittle fracture in Liberty Ships. These ships were built in the United States between 1941 and 1945, and were the first all-welded pre-fabricated cargo ships.

Tipper established that the fractures were not caused by the welding but were caused by the steel itself. She demonstrated that there is a critical temperature below which the fracture mode in steel changes from ductile to brittle. Because ships in the North Atlantic were subjected to low temperatures, they were susceptible to brittle failure. These fatigue cracks were able to spread across the fused metal of the ship's welded joint plates, instead of stopping at plate edges of a rivetted joint that would have previously been used.

In 1949 Tipper was appointed Reader and became the only woman to be a full time member of the Faculty of Engineering of Cambridge University.

She was the first person to use a scanning electron microscope (SEM) to examine metallic fracture faces. She used a scanning electron microscope built by Charles Oatley and his team, the second SEM ever built.
She retired in 1960 and her 100th birthday in 1994 was celebrated by Newnham College with the planting of the Tipper Tree, a sweet chestnut.

Works

- "The Production of Single Crystals of Aluminium and their Tensile Properties" (with H. C. H. Carpenter). *Proceedings of the Royal Society of London*(1921).
- *Deformation of Metal Crystals* (1935).
- *The Brittle Fracture Story* (1962).

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Prof. Paul C. Paris- Noteworthy Contributions

Paul Paris was born on August 7, 1930. Professor Paris has been internationally renowned for five decades for his contributions in the field of applied mechanics with emphasis on fracture mechanics and its applications to assessing integrity to structural components. If one prepares the chronology of major developments in fracture mechanics, (s)he will find that Prof. Paul Paris has been in the middle of most of these developments over a 30 year period.

1. In the 1950s when George Irwin proposed the stress intensity parameter, K, as a fracture criterion he turned to Paul Paris to look for innovative ways of calculating K. Prof. Paris' seminal work on Stress Analysis of Cracks co-authored with George Sih and published in ASTM STP 381 in 1965 is the single most important reference in the literature on this topic. This was followed by the first Handbook "The Stress Analysis of Cracks Handbook" that he co-authored with Hiroshi Tada and George Irwin which to this day remains the most important source for K solutions.

2. Prof. Paris had a major role in defining the concept of $K_{I\,C}$, the plane strain fracture toughness and its experimental determination. He worked very closely with stalwarts such as George Irwin himself and Edward Wessel and Chuck Tiffany to define a standard method of its determination which is described in ASTM standard E-399.

3. Prof. Paris' Ph.D. thesis led to the discovery of the relationship between fatigue crack growth rate, da/dN , and the cyclic Stress Intensity Parameter, ΔK. The relationship is known as the "Paris-law". The impact of this discovery cannot be overstated so it suffices to say it opened a very fertile field for research and application of fracture mechanics to structures that still continues to be the subject of hundreds of papers every year.

4. The concept of the threshold value of ΔK for fatigue crack growth was also a Prof. Paris invention.

5. Prof. Paris was instrumental in mentoring John Landes and Jim Begley when they first proposed the idea of J_{IC}, for characterizing fracture toughness of ductile materials that failed in a tearing mode as opposed to catastrophic brittle fracture mode. He later teamed with John Hutchinson to propose the theory for J-dominance ductile crack growth that extended the J_{IC} concept into the ductile tearing mode.

6. Prof. Paris and his graduate student Hugo Ernst proposed the tearing modulus concept for predicting instability that follows ductile tearing.

7. Prof. Paris has consulted for numerous large and small companies and government research laboratories

8. Prof. Paris is one of the superb educators in the field of fracture mechanics to engineers and academicians alike.

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