

ICF: The International Congress on Fracture

CEO/Treasurer Report

D M R Taplin

ICF President Emeritus/Chief Executive Officer/Treasurer

(1) This Report is presented to ICF Council via the Quadrennial Report of the Secretary-General at ICF14, The Fourteenth International Conference on Fracture, Rhodes, Greece June 18-23 2017. Professor A J Kinloch of Imperial College, London has been appointed Deputy Treasurer for the period June 15 2016 – June 23 2017 and as co-signatory on the ICF account at Lloyds Bank, London. Insofar as I have announced my retirement as CEO following ICF14 this Report additionally addresses my work within ICF since 1969 when I was first elected to ICF Council at ICF2 as the Founding Council Member representing Canada.

(2) During this half century ICF has evolved from simply organizing Quadrennial International Conferences as a "Great Meeting Place" to become the *de facto* premier world association/academy for work on fracture mechanics, structural integrity and safer engineering. Many view ICF as now possessing the global standing and remit at our half-century 1965-2015 of a World Academy in Safer Engineering, Structural Integrity & Fracture Mechanics as in my opinion the 1969 "Yokobori-Statutes" foreshadow.

(3) Alan Griffith (1893-1963) in the 1920's published his famous seminal paper on brittle fracture in the Transactions of the UK Royal Society and at the Delft IUTAM Conference. Griffith represents our fundamental beginnings - perhaps most cogently for ICF (as an affiliate of IUTAM) via that pioneering IUTAM Conferences in the 1920's. George Irwin (1907-1998) some 25 years later in the 1940's defined the fundamental concept of a critical stress intensity factor (KIC). In the peace following WWII there was a pioneering Fracture Conference organized by ASM in 1948 at which Irwin presented his ground-breaking theory. During those years and in the 1950's & 1960's others like Orowan, Zener, Paris, Cottrell, Yokobori, Wells, Eshelby, Bilby, Friedel, Rice, Averbach, Williams, Swedlow, Tetelman, McEvily were very active in our burgeoning engineering realm. Irwin was involved with Paris in several ASTM committees during the 1950's which organized various fracture conferences. From all this engineering foment & research in various countries arose the idea for ICF. At what we now view as "ICF0" Benjamin

Averbach (1919-1992) of MIT organized a micro/macro Fracture Conference in 1959 at Swampscott USA. Following various discussion meetings therefrom, including a key meeting of an embryonic ICF Committee at MIT in November 1961, Takeo Yokobori organized what became "ICF1" in Sendai, Japan in 1965. ICF was indeed formally established at what was billed as "ICF2" organized in Brighton, England in 1969 by Roy Nichols. At ICF2 Yokobori became the first ICF President 1969-1973.

(4) On a personal note, in 1967 I had been appointed an Associate Professor of Mechanical Engineering at the wildly ambitious University of Waterloo and I presented a paper on creep fracture at ICF2. It had been suggested to me by the innovative UW Dean of Engineering, Archibald Sherbourne, and my ambitious young HoD, Tom Brzustowski, that UW Professors needed to not simply present key papers at International Conferences but should bring such important World Events to the green fields of Waterloo.

(5) Accordingly at ICF3 in Munich, Germany 1973 I made a "rookie" bid for ICF4 to be hosted and well-funded by UW, Canada in 1977. The competition was the mighty MIT, USA led by Benjamin Averbach now the second ICF President (1973-1977). However brash Waterloo, Canada won and I was elected ICF4 Executive Chairman and as an ICF Director on ExCo. Being only 33 years old and but recently promoted as a Full Professor at UW I sought advice from similarly young "rookie" friends like John Knott, Ronald Armstrong, Michael Ashby, Jim Rice, David Embury, Bill Tyson, Brian Dyson, Palle Rama Rao, Michael Lewis, Dominique Francois, Tony Evans, Jerry Swedlow, Alan Tetelman - seeking new ideas for ICF4 - and indeed for ICF generally. Thereby we set a new benchmark at ICF4. This included the first Opening and Closing ICF Honour Lectures (by Michael Ashby & Bruce Bilby); extra focus on non-metallics (via for example Tony Evans & Mike Lewis) and composites (via Michael Piggott); entirely new realms (e.g. biomaterials and biomechanics via Kon Piekarski); Fracture, Politics, Society and Education (via Alan Cottrell & a team from the UK Open University); Full Archival Proceedings published prior to the Conference & Internationally (Pergamon: six volumes); and a balanced and integrated micro/macro academia/industry vision for the common good.

(6) At ICF4 there was a competition between France and the USSR to host ICF5 and Dominique Francois won for Cannes. At ICF4 Roy Nichols became the third ICF President.

(7) At ICF5 there was an interesting competition between myself, Dominique Francois of Compiegne, France and Janne Carlsson President of KTH Sweden to be ICF President which I won and thus became the fourth ICF President in 1981. This election was based on the mandate of an "ICF Strategy" presentation I made to Council. ICF6 was won by Palle Rama Rao for India.

(8) At ICF6 in New Delhi Dominique Francois became the fifth ICF President in competition with Harold Liebowitz famous for his hugely influential Fracture Series & International Journals. I became ICF Treasurer and thereafter *de facto* ICF Chief Executive Officer (CEO) working closely with Dominique whom I had first met at Stanford in July 1967 via Oleg Sherby/Alan Tetelman - a position to which I have been re-elected by each ICF Council at the seven subsequent quadrennial conferences working in close accord with eight ICF Presidents. Now I am 76 years old and it is surely time to pass the baton to someone else with fresh, new ideas. This has been an exciting half century for ICF 1965-2015 with various major triumphs and some historic difficulties overcome. The twelve years following ICF14 embracing ICF15, ICF16 & ICF17 2017-2029 provide enormous opportunities for ICF and a new leadership of ICF.

(9) NomCo (the ICF Nominations Committee) via Rob Ritchie (NomCo Chair) and Tony Kinloch (NomCo Deputy Chair) issued a Call for Nominations for ExCo (the ICF Executive Committee) & Officers 2017-2021. There are some multiple nominations for the various posts. Accordingly there are likely to be competitive elections at ICF Council in Rhodes, Greece at ICF14 in June 2017 for some Officer posts 2017-2021. ICF has benefitted from such competitive, democratic elections in the past for key posts and indeed for our Quadrennials. It was the ancient Greeks after all who invented Democracy, Science, Literature and Socratic Discourse 2,500 years ago and ICF14 hosted by Emmanuel Gdoutos promises to be a very special ICF Quadrennial.

(10) There are just two *ongoing* posts by Statute: Secretary-General & Treasurer/CEO. All other posts are limited by Statute to a single quadrennial term. Toshimitsu Yokobori is very likely to continue as Secretary-General 2017-2021 with Sendai, Japan being the ICF Registered Office. I have indicated that I will retire as Treasurer/CEO at ICF14 in 2017. Since ICF6 a major part of the work of ICF has been conducted by the Treasurer/CEO. Therefore it seems useful at this juncture to address the nature of the role of the Treasurer/CEO in considering the way forward for 2017-2021 and beyond. We especially

need a President and CEO/Treasurer who have both contributed the “heavy lifting” work within ICF over the years with acknowledged impact.

(11) As in any organization the CEO acts in a principal leadership capacity and primary spokesperson (in harmonious concert with the Secretary-General, President & ExCo). This is a proactive, creative task in enhancing the evolution of ICF as the world premier organization in our discipline of fracture mechanics, structural integrity and safer engineering.

(12) As CEO there is additionally the macro-management task of ensuring the smooth and effective workings of the various ICF Committees including ICF Council, ExCo (Executive Committee), AwardCo (Awards Committee), WebCo (Website & Publications Committee), NomCo (Nominations Committee) , IQCo (Interquadrennials/Regional Development Committee), QuadCo (Quadrennials Conference Committee). And responsibilities regarding finance as in the Statutes. There is quite a bit of travel for meetings of various sorts. Altogether the workload involves some 300hours/year, *pro bono* with a strong primary commitment to ICF and some personal financial support.

(13) One of various policies that I set forth creating a democratic mandate as ICF President from 1981 to enhance the world standing of ICF (subject always to Council endorsement) was that ICF Quadrennials ought to be hosted by the four super-powers: India, China, USSR, USA - and to develop an Interquadrennials programme for balance and wider opportunity.

(14) The first step in this regard was to organize the very first ICF Interquadrennial Conference in Beijing, China in November 1983 (I chaired the International Steering Committee as ICF President). Nai-Yong Tang of Tsinghua University was an important early catalyst in ICF/China developments with Hwang Keh-Chi and Shouwen Yu - as well as, later, Wei Zhou of NTU Singapore. This first ICF Interquadrennial was a very great success not too long after the “Cultural Revolution” and ICF-IQ Beijing 1983 was published in a handsome enduring volume of Proceedings.

(15) The second step in this regard was the organization of ICF6 in New Delhi, India via Palle Rama Rao. This was at an historical time for India. Rama Rao created an extraordinarily successful quadrennial in complex circumstances.

(16) At ICF6 there was a fierce competition USA v Australia for ICF7 (Houston vs Melbourne). In the event via a close democratic vote of ICF Council the third policy step was accomplished via ICF7 being organized in Houston, Texas, USA in 1989 very successfully via Kamel Salama & Ravi-Chandar.

(17) At ICF7 Rama Rao became the sixth ICF President 1989-1993. In Houston there was a forthright debate on ICF8 which was won by USSR with ICF8 to be in Moscow in 1993. This was the fourth step. In the event via internal USSR discussions and the break-up of the USSR, ICF8 was organized in Kiev, Ukraine in 1993 via Volodymir Panasyuk. John Knott became seventh ICF President 1993-1997. Several ICF IQ conferences (including a major ECF in Kazan) have been organized in Russia especially in Moscow via Robert Goldstein.

(18) At ICF8 Australia mounted another bid (this time successfully) for ICF9 in Sydney in 1997 via Bhushan Karihaloo & Yiu-Wing Mai. There was competition in Sydney for ICF10 including from Japan & USA and innovatively ICF10 was organized in Honolulu in 2001 via Rob Ritchie, Ravi-Chandar, Teruo Kishi & Toshimitsu Yokobori.

(19) At ICF9 Rob Ritchie became the eighth ICF President. China did not bid for ICF9, nor for ICF10, nor for ICF11. ICF11 was won competitively for Turin, Italy via Alberto Carpinteri.

(20) At ICF10 Yiu-Wing Mai became the ninth ICF President. At ICF11 China did bid for ICF12 but Canada won ICF12 via Bill Tyson & Mimoun Elboujdaini for Ottawa in 2009 and Ravi-Chandar became the tenth ICF President. Extraordinarily at this stage a special dispensation was then decided upon by ICF Council whereby from ICF11 Council would decide on the location of the Quadrennial eight years ahead rather than four years ahead. This also then allowed for extended negotiations on the Quadrennial MoU.

(21) At ICF11 it was decided by Council to host ICF13 in Beijing, China in 2013 via Shouwen Yu. This was the fifth and final step. This completed one of my ICF Presidential policies of 1981 supported by Council and electoral mandate that the ICF Quadrennials should be organized in India, USA, USSR, China as the four world super-powers with also the launch of the Interquadrennials Programme. This also created the policy of deciding on the location of the Quadrennial eight years in advance taking account of the extended nature of negotiating and agreeing the Quadrennial MoU. We now need to address South/Latin America and a Quadrennial in Brazil

and in Africa. But we have a long reach and a long-range strategy for all ICF Regions and National organizations via the burgeoning Interquadrennials Programme led by Mimoun Elboujdaini.

(22) At ICF12 in Canada it was decided by Council that ICF14 would be hosted by Rhodes Greece in 2017 with Emmanuel Gdoutos as ICF14 Executive Chairman. Alberto Carpinteri became the eleventh ICF President 2009-2013. NomCo via Chair Yiu-Wing Mai and Council approval ICF named for orderly progression Yu Shouwen as Senior Vice-President 2009-2013 and President-Designate 2013-2017 instituting another new policy via Council decision.

(23) At ICF13 in Beijing Shouwen Yu became the twelfth ICF President with Emmanuel Gdoutos as Senior Vice-President - and ICF Council decided that ICF15 would be hosted by Vancouver, Canada with Ashok Saxena as ICF15 Executive Chair. ICF15 will now be in all likelihood in Atlanta USA due to a combination of circumstances related in part to the MoU dual nation negotiation process.

(24) At ICF12 in Canada via the AwardCo Chair Ashok Saxena a major new ICF policy was introduced regarding world renowned ICF Gold Medals and other Awards to enhance the world-premier prestige of ICF. This built on the ICF Honour Lecture Programme whereby Mike Ashby gave the Opening ICF Honour Lecture at ICF4 and Bruce Bilby gave the Closing ICF Honour Lecture at ICF4 with prestigious ICF Honour Lectures thereafter by Jim Rice, Roy Nichols, John Hutchinson, John Knott, Tony Evans, Rob Ritchie, Alberto Carpinteri, Yiu-Wing Mai, Subra Suresh for example - and now an enormously worthy cadre of ICF Gold & Silver Medallists. Ashok continued this enormously important AwardCo work at ICF13 with truly world figures receiving our ICF Gold Medals. And Alberto Carpinteri is now continuing the AwardCo work of Ashok towards ICF14 and there has been a call for award/medal nominations.

(25) At ICF12 was introduced the major development of the ICFweb.org website led via Francesco Iacoviello currently President of the Italian Group on Fracture (IGF). This is directly funded in small part via an Agreement with Curran Associates via a contract on reprints of ICF Proceedings. In large part this is funded via IGF and this is an important matter to address by the new CEO/Treasurer.

(26) At ICF11 in Turin the system of an ICF Quadrennial MoU was introduced by Canada (Laurier Forget) for ICF12. This has been successful for now ICF12, ICF13, ICF14 and will be progressed for ICF15 and ICF16

at ICF14. ICF now has a wide range of understandings and MoU's with national groups such as DVM, ASTM, IGF, CSTAM, JSSFM, UKFESI, InSIS, AFG, IsSIS, EgSIS, FrSIS, CFRC. We hope to build on this Regional Development for all the 50+ national ICF Groups.

(27) Highlights of the 2013-2017 Quadrennium include: An enlarged ExCo with now ten ExCo Directors representatively and thus altogether sixteen voting members of ExCo; ICF Mid-Term ExCo in Anaheim May 2015; Official ICF Nominations for the Queen Elizabeth II Engineering Prize and for the Japan Prize; Potential bids mooted for ICF16, 2025 by Bangalore, India; Berlin, Germany; Melbourne, Australia; Paris, France for decision by ICF Council at ICF14; Addressing complications regarding ICF15, 2021; Various Interquadrennials in Russia, Africa & Asia especially with plans for South America & variously; New Regional Groups (India, Egypt and others). A key ICF Interquadrennial by InSIS in Bangalore, India in July 2015. Most importantly creative work on ICF14 in Greece.

(28) Self-evidently ICF is in a very healthy state at the half-century stage 1965-2016 looking towards new and adventurous strategies for our second half-century. ICF has evolved from the vision of being a "Great Meeting Place" quadrennially to become a premier World Association/Academy, as I believe was foreshadowed by the vision of Takeo Yokobori. A key next step involves the work of NomCo towards the election by Council of a new ExCo and a potentially adventurous new era for ICF with an exciting new team.

(29) In June 2015 there was a fraud attempt of GBP3,700 via a hacking process on the ICF account with Lloyds which was successfully addressed by Lloyds and the UK Police. Although the ICF account is always of the order of GBP10,000 maximum balance there is a need for vigilance. The expenditure 2013-2017 is similar to 2009-2013 as in the previous CEO/Treasurer Report to ICF Council in Beijing at ICF13 and the balance at ICF14 will be similar to the balance reported at ICF13. In the circumstances the details will be lodged separately with the Secretary-General. The way forward recommended for the 2017-2021 period is for the Lloyds account to be simply closed and the final balance transferred to a new account established by the new CEO/Treasurer. Arrangements have been made for Tony Kinloch of Imperial College, London to be a co-signatory on the Lloyds account in London for any necessary facilitation. A key next step involves consideration of a new financial policy for ICF by the new CEO/Treasurer perhaps involving the establishment of an ICF charitable arm for fund-raising.

(30) It has been my honour and privilege to have served ICF overall 1969-2017 as President 1981-1984 and especially 1984-2017 as CEO/Treasurer. I have been warmly supported by the whole ICF community and twelve Presidents. Through ICF I have had the privilege of working closely with many "Greats" including Alan Cottrell on especially "Fracture & Society"; Mike Ashby on "Fracture Maps and Creep Fracture"; John Knott on "Micromechanisms and Turbine Alloys" (including the IoM3 Parsons Series); Tony Evans on "Metal/Ceramic Composites" at UCSB; Ashok Saxena on "Creep Fracture" as Rolls-Royce Professor at Georgia Tech; Mike Lewis on "Advanced Ceramics" via Warwick University; Gordon Dunlop on "Lightweighting & Industrial Ecology" via Nanyang Technological University/Queensland University; Robert Ritchie on the BioMaterials Realm; Alberto Carpinteri, Palle Rama Rao, Emmanuel Gdoutos, Takeo & Toshimitsu Yokobori, Mimoun ElBoujdaini, Francesco Iacoviello - on "ICF Grand Challenges"; Jim Rice on many discussions on "Fundamentals" including dendritic growth of intergranular creep cavities and the fracture of the earth itself; the incomparable Paul Paris on "Fatigue"; Tony Kinloch & Peter Flewitt in England; Bill Tyson in Canada - my two homelands. The cornerstone of my strategy for some fifty years has been that ICF has aimed to be an imaginative community of good friends worldwide - in a possibly unique way in such engineering societies as ours. With a mission of **Safer Engineering** for the common good of humanity and the planet. This has been facilitated through my career trajectory working in many countries. Starting from industry in Birmingham then Oxford, England onwards to Melbourne, Australia; Varanasi, India; Waterloo, Canada; Houston Texas; TCD, Dublin, Ireland; UCSB California; Plymouth, England; Exxon NJ USA; NTU Singapore; Queensland, Australia; UCC Cork, Ireland; Aston, Birmingham, England and an especially transformational year 1974-1975 at Cambridge with Ashby & Knott - and now to Vancouver. During this time sailing has been a passion, racing & cruising and I have owned ten sailboats over the years. But above and beyond all matters of the legacy of my ICF career and other aspects of life I am a family chap and I am blessed with four amazing children and ten exceptional grandchildren. All this has been lived via my hopefully worthwhile work (which it is for others to judge) within the great landscape and global hinterland of ICF. Many, many thanks to the whole ICF community for electing me and supporting me over these many years to my various posts and for the many warm & creative friendships which have sustained and gloriously enriched and fulfilled my life.

Vancouver, Canada

Canada Day, July 1 2016